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This magazine is published to promote sound thought concerning industrial medicine and the surgery of trauma. To that end it will contain articles, news items, reports, digests, and other presentations, together with editors' comments. The editorial policy is to encourage frank discussion. On this basis contributions are invited. The editors will exercise care in checking on the accuracy of data printed but in all other respects articles and opinions of which expression is allowed are the opinions of their authors—the editors reserving in all cases the right to comment on the same in the current or any subsequent issues as they may be inclined.

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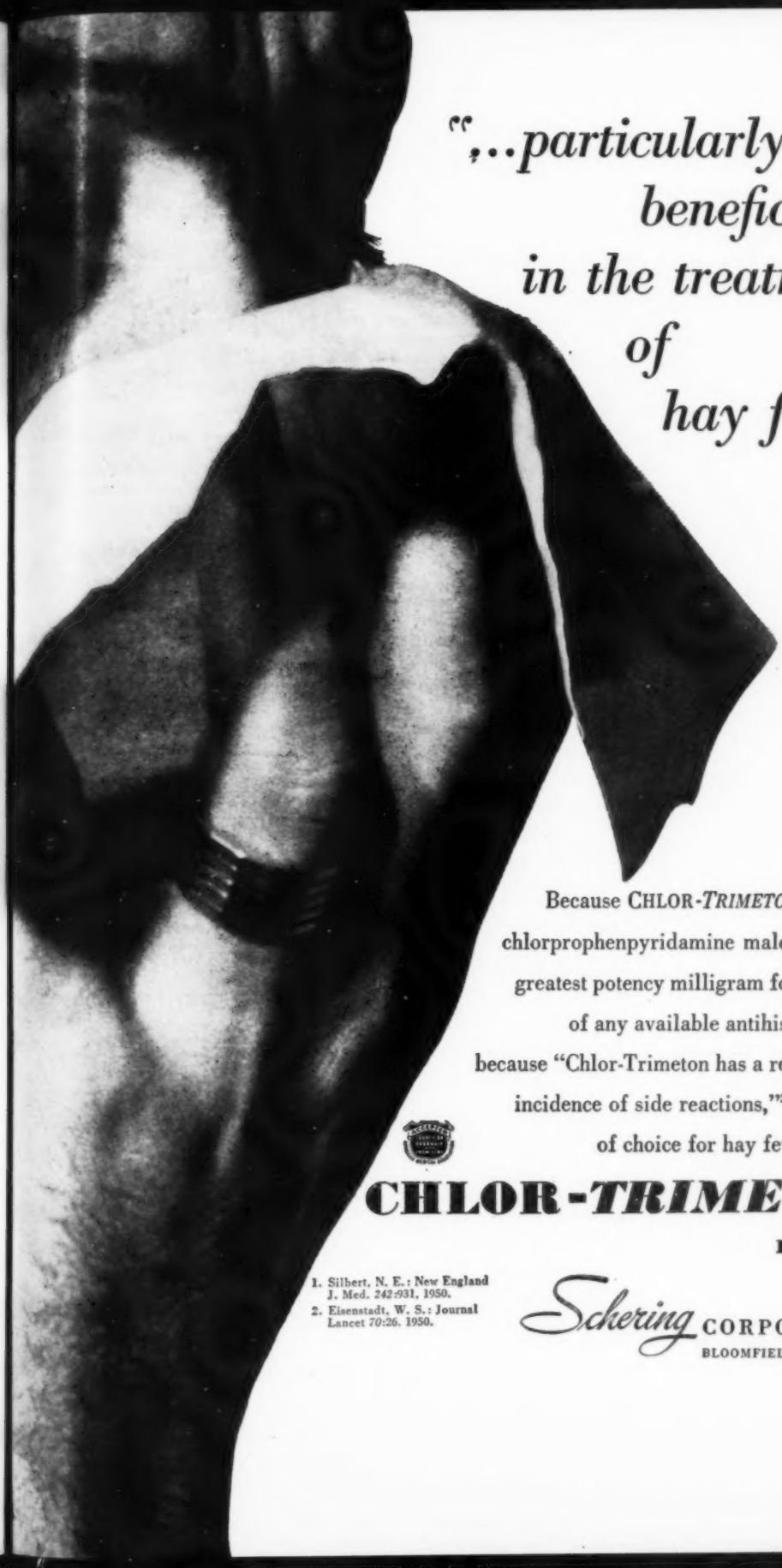

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A NEW preventive medical service for business executives is announced in New York. It is called The Madison Foundation for Biochemical Research. SAMUEL MARKEL, President of American Fidelity and Casualty Company, is the Foundation chairman. He is quoted as follows: "The average American business executive is medically underprivileged, compared to the average industrial worker, and consequently dies nearly six years sooner than his employee. This situation, it is obvious, represents a staggering annual loss to American business. The loss is not measured in dollars alone but also by the dilution of the level of management know-how because most executives die at the height of their managerial capacities. The tragic thing is that medical science has the means to correct this trend. The means are the use of what doctors call preventive medicine, detecting disease before it kills or cripples." The Foundation proposes to extend its disease-detection facilities, laboratory and medical, to business groups on an annual fixed-fee basis.

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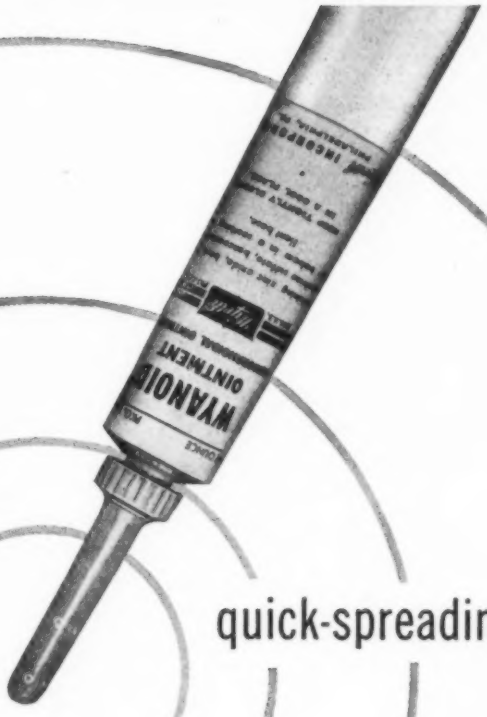

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Industrial Medicine Program

PRELIMINARY moves with far-reaching implications for expansion of industrial medicine in this area have been made in a joint project of the Chamber of Commerce of Greater Philadelphia and the University of Pennsylvania. Announcement was made recently by Albert M. Greenfield, president of the chamber, and Dr. Harold E. Stassen, president of the University, that a joint committee has been studying the need for expansion of industrial medical service to combat on-the-job illness. With the realization that an immediate need for professional medical service must be met, the announcement said, a long-range program to aid business in establishing in-plant medical services has been developed to give professional attention to the on-the-job illness and thwart any trend toward socialized medicine. The committee reported: "A survey revealed that a great many doctors in private practice within the Philadelphia area devote part time to in-plant work. Also there are quite a number of physicians who are looking for part-time work in industry. All but a few of these physicians are inexperienced in industrial medicine and most of them have little conception of what they would do if a full-time job in a small plant were offered to them." As a result of this survey, a plan has been developed under which the University's School of Medicine will create a new division for industrial medical activities. The joint statement disclosed that the plan is one of both long-range and short-range objectives. The

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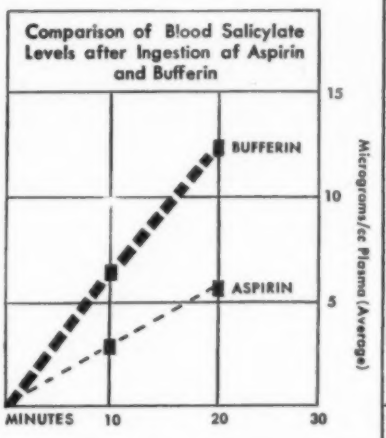
1 ACTS TWICE AS FAST AS ASPIRIN

The antacids in Bufferin speed its pain-relieving ingredients through the stomach and into the blood stream. Actual chemical determinations show that within ten minutes after Bufferin is ingested blood salicylate levels are higher than those attained by aspirin in twice this time.[1]



2 DOES NOT UPSET THE STOMACH

Bufferin's antacid ingredients protect the stomach against aspirin irritation. This has been clinically demonstrated on hundreds of patients.

in usual doses

In a series of 238 cases, 22 had a history of gastric distress due to aspirin but only one reported any distress after taking 2 Bufferin tablets (equivalent to 10 grains of aspirin).[1]

in large doses

In a recent study group, 1006 patients received, over a 24 hour period, 12 Bufferin tablets (equivalent to 60 grains of aspirin). Although 72 had a history of being sensitive to aspirin, only 18 reported any gastric side-effect with Bufferin.[2]

1. Effect of Buffering Agents on Absorption of Acetylsalicylic Acid. J. Am. Pharm. Assoc., Sc. Ed. 39:21, Jan. 1950
2. Gastric Tolerance for Aspirin and Buffered Aspirin. Ind. Med. 20:480, Oct. 1951

INDICATIONS: Simple headaches, neuralgias, dysmenorrhea, muscular aches and pains, discomfort of colds and minor injuries. Particularly useful when gastric hyperacidity is a complication. Useful for relieving pain in the treatment of arthritis.

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short-range plan will offer a post-graduate course in industrial health at the University. This course, although not an end to itself, will have a complete curriculum with qualified guest lecturers. Its purpose is to stimulate active interest in a coordinated program of industrial medicine for the Philadelphia area. The long-range program will integrate the industrial medicine viewpoint into under-graduate teaching; extend in-plant medical services to small plants, and maintain clinics to be established in the strategic areas to supplement the in-plant services of small plants by offering complete health services. Commenting on the University's plan, Greenfield said: "The Chamber of Commerce welcomes the opportunity to co-sponsor such an activity which promises new benefits to business as well as to the community at large. Modern business realizes its moral debt to employees' well-being, and business knows that healthy employees are more contented and less prone to absenteeism and avoidable accidents. The loss of full production in these days of emergency is curtailed by an adequate in-plant medical service." Greenfield said the chamber's Safety Council industrial health section would proceed to create further demand for industrial doctors by explaining the needs of industrial medicine to trade executives. The University's post-graduate course in industrial health will start early in 1952. The 12 afternoon classes will schedule pre-eminent medical and technical guest lecturers, specialists in industrial problems.

—JOSEPH F. NOLAN, Medical Editor, in *The Philadelphia Inquirer*, November 25, 1951.

Recent Deaths

THE WESTERN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS has sent a sum of money to the AMERICAN FOUNDATION OF OCCUPATIONAL HEALTH in memory of its member, JOHN M. MCCULLOUGH, M.D., Rodeo, California.

WILLIAM H. SCHELLHAMER, M.D., 60, at York, Pennsylvania, March 21, 1952. DR. SCHELLHAMER was born in October, 1892, at Albany, Berks County, Pennsylvania; was educated at York Collegiate Institute and Ursinus College, where he received his A.B. in 1912; and graduated M.D. at Medical Chirurgical College, Philadelphia, 1916. He had been engaged in industrial work for many years, looking after the medical interests of employees of 38 plants. He was a member of the PHILADELPHIA INTERSTATE ASSOCIATION OF INDUSTRIAL MEDICINE, and was to have been made an I.M.A. Fellow at the Cincinnati meeting. He was an interested contributor to numerous plant magazines on matters of industrial health, and the author of a number of scientific articles one of which, on the wearing of rings while working, appeared in *Industrial Medicine*.

THIS MONTH

PARADOXICAL, but true, it is that a silent participant in every current meeting of industrial physicians, industrial hygienists, even industrial executives, is NOISE. Never in decibels, always in thought, it haunts the consciousness—so ominous that it is mentioned *sotto voce*, almost in trepidation. As of today, NOISE is the menacing thunderhead in the industrial skies. "Not the pleasing sounds of work, 'the thud of the axe in the clearing, the whip of the thresher's flail,' but the overpowering clang and roar and clatter of the 'engine-handed age' that man has made —the tumult that has changed 'the obbligato of toil' to a cacophony of sound unwanted, unpleasant—and, much worse, potentially compensable." As of tomorrow—the compensation. Such is the fear. That it has a basis in reality—in fact, law, scope, and imminence—is well set forth in NOEL SYMONS' "Trends in Compensation Attitudes" (page 216). MR. SYMONS points out that "occupational deafness as a compensable disease is an entirely new medicolegal concept which requires an intimate understanding of the fact that many of yesterday's ideas are apt to become obsolete tomorrow." And thus the problems of the causes, effects, measurement, costs, and control of NOISE are of immediate, almost paramount, importance to industrial physicians. A good groundwork toward profitable acquaintance with these problems and their answers may be found in the just-published NOISE textbook from which MR. SYMONS' article is reprinted. This textbook is procurable from the School of Public Health, University of Michigan, 109 South Observatory Street, Ann Arbor. It is the last word, and the complete word, on NOISE in Industry.... THE "First Aid Guide for the Small Plant" (page 229) is being published in a pocket-size booklet, and soon will be available for wide distribution.... DR. FERLAINO—"New Anti-Tuberculosis Drugs" (page 213)—describes the hydrazides of isonicotinic acid with the conservatism of restrained hope that should characterize all such descriptions, but too often does not, especially in the lay press. "It is well to bear in mind that none of the patients so far treated have been discharged as fully arrested or 'cured'".... LEONARD GREENBURG, M.D., since 1935 Director, Division of Industrial Hygiene and Safety Standards, New York State Department of Labor, received the 1952 DONALD E. CUMMINGS AWARD, at the thirteenth annual meeting of the AMERICAN INDUSTRIAL HYGIENE ASSOCIATION at Cincinnati, April 22. This, the Association's highest honor, was given DR. GREENBURG because of his "great work in the medical, engineering and administrative aspects of industrial hygiene".... LEROY H. SLOAN, M.D., well known in the early history of industrial medicine, was chosen President-Elect of the American College of Physicians at that organization's recent annual meeting in Cleveland.... CHARLES G. FARNUM, M.D., one of the founders of the American Association of Industrial Physicians and Surgeons (now the INDUSTRIAL MEDICAL ASSOCIATION), died at Peoria, Illinois, April 24, at the age of 77.... FROM "Queries and Minor Notes," *J.A.M.A.*, April 12, 1952: "(Q): Have there been any studies made of hearing loss due to the effect of noise from daily shaving with an electric shaver? I appreciate the difficulty of separating the effect of this acoustic trauma from others suffered in daily life but would like an opinion. (A): It is unlikely that daily shaving with an electric shaver would produce measurable acoustic trauma. Perusal of medical literature fails to reveal reports or studies in this connection." *Reductio ad absurdum?*

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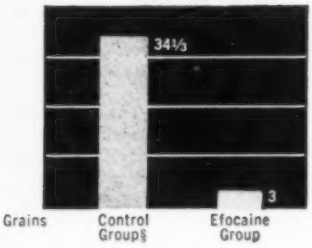

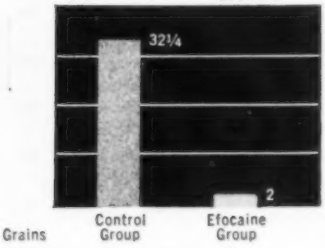

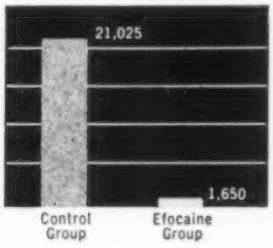

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Supplied in 20-cc. multiple-dose vials through your usual source of supply.

LITERATURE ON REQUEST

‡Iason, A. H., and Shaftel, H. E.: A New Approach to the Problem of Postoperative Pain, Am. J. Surg. 83, (April) 1952.

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Industrial Medical and Related Chronology selected and arranged by ROBERT T. LEGGE, M.D., F.A.C.S., Berkeley, California

"The intellectual who cannot live any more as an independent producer comes to live as a salaried official, and is therefore induced to write his ideas into laws instead of writing them into books"—Bertrand de Jouvenel.

♉ = Taurus — April 20-May 20 ‖ ♊ = Gemini — May 21-June 21

1952 MAY

MAY, and blossom time; and hedge and garden to the sun oppose "free hearts, free foreheads"; and only man is vile.... He greets the month with festivals of his power; bids it adieu with salutes to the little crosses that mark the wake of his wars. There will be peace when he learns that all his guns and marching men can't make a single rosebud....

☽ 1st Quar. ○ Full Moon ☾ 4th Quar. ● New Moon

1 ☽ Th
1947—Carey P. McCord given the Knudsen Award at Buffalo.
1919—The Journal of Industrial Hygiene established at Boston, with Dr. David L. Edsall, Editor, and Dr. Thomas M. Legge, Honorary Consulting Editor.

2 ♉ Fr
1886—Jesse W. Lazear, of U.S. Army Yellow Fever Commission, the medical officer who laid down his life in the investigation, born in Baltimore.
"It's a year when we've got to decide if we'll have two cars or two tax collectors in every garage"—

3 ♉ Sa
1933—Harvey Cushing, Sterling professor of neurosurgery, Yale, addressed the Boston Surgical Association on the topic "Homo Chirurgicus."
1798—Dr. James Craik was appointed Physician General, U.S. Army, which post he held until 1800.

4 ♉ S
1926—George R. Minot and William P. Murphy, of Harvard, reported before the Association of American Physicians their discovery of the cause of pernicious anemia.
1941—The Western Association of Industrial Physicians and Surgeons held its first meeting, Del Monte, California.

5 ♉ M
1894—Wilhelm C. Roentgen, discoverer of the X-ray, born.
1913—American College of Surgeons organized at Washington, D.C. Appointed a committee for Minimum Standards for Medical Service in Industry.

6 ♉ Tu
1856—Sigmund Freud born at Frieburg, Moravia. Explorer of the subconscious mind, using a method he called psychoanalysis.
1932—Sir Thomas Legge, His Majesty's Factory Inspector, died at Wintergreen, Wallingham.

7 ♉ W
1941—Royd R. Sayers given the Knudsen Award at Pittsburgh.
"We have learned the lesson that when opportunities for profit diminish, the opportunities for jobs likewise disappear"—American Federation of Labor.

8 ♉ Th
1700—Isaac Newton (1642-1727), the greatest name in English science, wrote the first preface of the *Principia*, the mathematical principles of natural philosophy.
"Candidate: A person who stands for what he thinks people will fall for"—Outdoor Ind.

9 ○ Fr
1908—P. Buckmann, a St. Petersburg surgeon, developed an operation for bony ankylosis of the elbow joint.
"There is no such thing as a moral or an immoral book. Books are well written or badly written. That is all"—Oscar Wilde

10 ♉ Sa
1930—Fred H. Albee, a New York City orthopedic surgeon, announced a bone graft operation of the spine, after 20 years of experience.
"Nothing produces such an effect as a good platitude"—Oscar Wilde

11 ♉ S
1944—Harold A. Vonachen, Medical Director, Caterpillar Tractor Company, given the Knudsen Award at St. Louis.
"But words are things, and a small drop of ink, falling like dew, upon a thought produces that which makes thousands, perhaps millions think"—Byron

12 ♉ M
1820—Florence Nightingale, the Lady of the Lamp, born of English parents at Florence, Italy. Mother of modern nursing. Her "Notes on Nursing" was published in 1859.
"Service: The anesthetic used in picking pockets"—Jack Woodford

13 ♉ Tu
1607—The first permanent English settlement in America at Jamestown, Virginia. It was here that the first glass factory in America was erected.
1857—Sir Ronald Ross born in India. Discoverer of the transmission of malaria by the Anopheles mosquito.

14 ♉ W
1796—Edward Jenner performed the first vaccination to prevent smallpox at Berkeley, England, on the boy Phipps.
"I cannot give you the formula for success, but I CAN give you the formula for failure—Try to please everybody" —Herbert Bayard Swope.

15 ♉ Th
1843—Iliya Netchnikof, a noted Russian bacteriologist and physiologist, was born at Levanovka. Discoverer of phagocytes and phagocytosis. Nobel Award 1905.
1919—Alvin Schoenleber began his medical career with Standard Oil of New Jersey.

16 ☾ Fr
1931—Samuel M. Dodek, a Cleveland physician, developed an obstetrical method of delivery in posterior position in treating 500 consecutive cases.
"One man with courage makes a majority"—Andrew Jackson.

17 ♉ Sa
1946—The first meeting of the Ramazzini Society was held at St. Clair, Michigan. Dr. Robert T. Legge delivered the first Ramazzini Oration.
"The public for which masterpieces are intended is not on this earth"—Thornton Wilder.

18 ♉ S
"The bumblebee, ignorant of the scientific truth that the size, weight and shape of his body in relation to total wing spread make flying impossible, goes ahead and flies anyway—and makes a little honey every day"—General Motors.

19 ♉ M
1857—John Jacob Abel born at Cleveland, Ohio. Professor of pharmacology, Johns Hopkins. Isolated epinephrine.
"It is not surgery that kills people; it is delayed surgery" —Dr. William Mayo.

20 ♉ Tu
1911—John Homer Wright, Boston pathologist, discovered a stain for malaria and syphilis organisms and a new method of counting blood platelets.
"Most of us are little souls carrying big bodies. And the strain is too much for us"—Epictetus (1st century AD)

21 ♊ W
1928—Dr. Hideyr Noguchi of the Rockefeller Institute for Medical Research died at Acera, West Africa. He gave his life for humanity in a scientific endeavor to discover the relations between South American and African yellow fever.

22 ♊ Th
"Doing business without advertising is like winking at a girl in the dark. You know what you're doing, but no one else does"—S. D. Warren & Co.
"Wisdom is made up of ten parts, nine of which are silence, and the tenth, brevity"—Hamilton Wright Mabie

23 ● Fr
1785—Benjamin Franklin, first American scientist and diplomat of Philadelphia, invented bifocal spectacles.
1731—Frank Anton Mesmer was born at Ignang on Lake Constance. Doctor of Medicine, and founder of hypnotism as a mode of therapy.

24 ♊ Sa
1743—Jean Paul Marat was born at Boudry, France. Originally a physician, became a Revolutionary leader.
"A man should never be ashamed to own he has been in the wrong, which is but saying that he is wiser today than he was yesterday"—Alexander Pope

25 ♊ S
1888—Francis Galton, English scientist, the father of eugenics, on this day lectured before the Royal Institute.
"The sick are the greatest danger for the healthy; it is not from the strongest that harm comes to the strong, but from the weakest"—Nietzsche

26 ♊ M
1943—William A. Sawyer, Medical Director, Eastman Kodak Company given the Knudsen Award at Rochester, New York.
"Gastric ulcer seldom has classical symptoms"—Sir William Osler.

27 ♊ Tu
1910—Robert Koch died at Baden Baden, Germany, pioneer bacteriologist. From his brain and researches came Koch's postulates. Discovered tubercle bacillus.
"There was never yet philosopher that could endure the tooth-ache patiently"—Shakespeare.

28 ♊ W
1755—The cornerstone was laid with much ceremony at the Philadelphia Hospital at Philadelphia. On its seal is inscribed, "Take care of him and I will repay thee."
"A man should be upright, not be kept upright"—Marcus Aurelius

29 ♊ Th
1829—Sir Humphrey Davy, celebrated English chemist, died at Geneva. Professor, Royal Institution at London. Advanced the idea H was required to give the acid effect. Discontinued nitrous oxide for pain relieving. Invented the Miner's Safety Lamp.

30 ♊ Fr
1952—Memorial Day.
1910—Robert Koch, the world's greatest medical scientist, was cremated at Baden Baden. "He dragged into the light some of the most dangerous inhabitants of the world of the microscopically small."

31 ☽ Sa
1752—Dr. John Brooks, a famous Revolutionary patriot, was born at Medford, Massachusetts. A hero at Concord. Six times governor of his state. L.L.D., Harvard.
"It is the duty of the individual, wherever possible, to practice his own preventive medicine"—Howard A. Rusk.

"The sum of all known reverence I add up in you, whoever you are;
The President is there in the White House for you—it is not you who are here for him;
The Secretaries act in their bureaus for you—not you here for them;
The Congress convenes every twelfth-month for you;
Laws, courts, the forming of states, the charters of cities, the going and coming of commerce and mails, are all for you."
—Walt Whitman.

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INDUSTRIAL MEDICINE AND SURGERY
The Journal of Medicine in Industry
With which are consolidated "The Industrial Doctor" and "International Journal of Medicine and Surgery"
Volume 21 MAY 1952 *Number 5*

Clinical Ballistocardiography
— Value and Limitations of the Portable Ballistocardiograph in the Detection of Heart Disease —

S. CHARLES FRANCO, M.D., F.A.C.P.
Consolidated Edison Company of New York, Inc.

IN THE PAST few years there have been an increasing number of reports indicating that an abnormal ballistocardiogram pattern is associated with an increased tendency to heart disease, particularly of the coronary artery type. In 1948 Starr and Mayock[1] reported a study of abnormal forms of the ballistocardiogram in 234 cases with 40 necropsies and suggested that apparently normal individuals with abnormal tracings will manifest heart disease within the decade more frequently than those with normal tracings. Dock and Mandelbaum[2] find a high percentage of abnormal ballistocardiograms in the study of patients with angina pectoris, and feel that the incidence of coronary sclerosis in our population as evidenced in pathological reports explains in part the increasing percentage of abnormal ballistocardiograms in the apparently normal persons over 50 years of age.

The diagnosis of degenerative cardiovascular disease associated with hypertension and coronary artery disease, such as thrombosis and angina, is quite easily established. However, the detection of asymptomatic coronary artery disease, which can produce unheralded cardiac catastrophe and severe disability, poses problems because clinical examination, x-ray of the heart and the electrocardiogram may be entirely normal in such cases. The situation is further complicated because coronary artery disease has its origin in insidious processes that have their onset many years before the clinical disorder becomes evident. One of the main deficiencies of the periodic physical examination has been the inability to uncover latent coronary artery disease. The predominance of this type of degenerative heart disease adds to the problem. Coronary artery disease in one form or another accounted for nearly 45% of the cases of heart disease in a recent study of cardiovascular disease in industry undertaken at Consolidated Edison.

Some methods of investigation for heart disease, such as the slit roentgen kymograph and the electrokymogram seem to be adapted more to research purposes than to clinical use. Clinical tests to uncover latent insufficiency of the coronary arteries also have their shortcomings. The oxygen deprivation test of Levy, while appearing accurate, has been objected to by some observers as having some inherent danger. The "two-step" exercise electrocardiogram test devised by Master is a safe procedure, but some investigators state that it gives positive results in only half of the cases of coronary artery disease. Still others would vary the exercise to fit the person being tested, and feel that a standardized exercise test might not be adequate to uncover latent coronary disease in all cases. For example, in the past year Scarborough and his co-workers,[3] reported on ballistocardiogram abnormalities induced by anoxemia in persons with a history suggestive of angina pectoris. They noted that in two of four patients in whom the control ballistocardiogram became abnormal or more abnormal there were electrocardiographic changes during anoxemia which satisfied Levy's criteria for a positive test and in both patients chest pain was produced. Previous Master tests on these patients had been negative. These tests require valuable time, and it has been estimated that the performance of the Master double "two-step" test can take up to one-half hour.

At the onset of our study in January, 1950, the Dock portable electro-magnetic ballistocardiograph appeared to offer a simple method which might quickly and easily give us worthwhile information concerning the presence of latent heart disease. It was already evident that many forms of heart disease were often associated with an abnormal ballistocardiographic pattern, and we decided to study the instrument on a group of individuals, a large percentage of whom were essentially normal, who were undergoing periodic examination on an annual basis. The results of this study form the basis of the following report.

Portable Electro-Magnetic Ballistocardiograph

THE ballistocardiograph records the movements of the body imparted by the movement of the blood within. When the body lies on a smooth

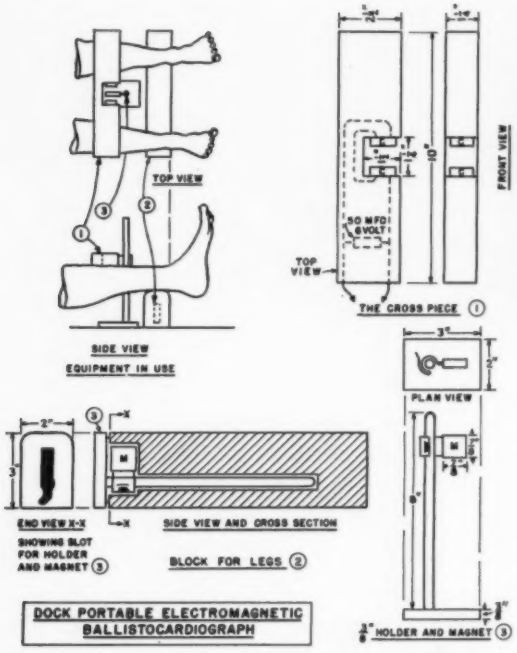

Fig. 1.
C=Electrical generating coil (8000 turns No. 40 wire)
M=Alnico flat magnet

solid surface it moves with each cardiac cycle and with the respiratory cycle. The table model ballistocardiographs, both of the high frequency and critically damped, low frequency type,[4] have proved too bulky for routine clinical use. Several years ago Dock[2] developed a portable ballistocardiograph (Fig. 1) consisting of a two-coil electro-magnetic pickup housed in a light material, such as wood or plastic, which lies across the shins. An Alnico flat fixed magnet is aligned between the coils. Movement of the body causes the coils to move in the magnetic field and an electric current is produced. A standard electrocardiograph instrument can be utilized for recording. The direct-writing electrocardiograph which we have used is standardized so that one centimeter equals one millivolt.

The ballistocardiograph is essentially a simple means of recording mechanical heart action. It measures displacement of the body produced by the push and recoil arising from the mass and velocity of ventricular ejection of blood. This motion of the body on the viscous subcutaneous tissue can be damped by obesity, altered by muscular tension, and perhaps even affected by the aging process in the body with loss of tissue elasticity. The ballistocardiogram can also be influenced by respiration, since the rib cage moves headward and the viscera footward. Dock has utilized a 50 microfarad condenser across the leads from the coils to filter out this respiratory component except for a slight change in the base line.

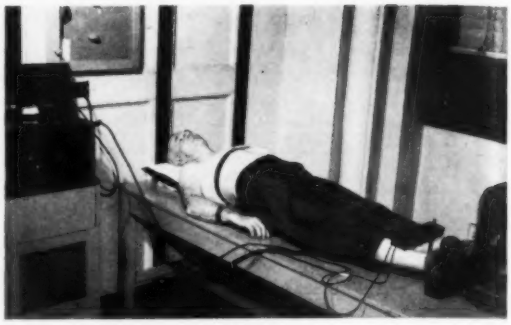

Fig. 2.

It is our practice to record the ballistocardiogram after the routine electrocardiogram with the patient breathing normally and under basal conditions. It has been shown that the ballistocardiogram taken after meals or smoking can be abnormal in some patients with normal basal tracings. The patient is placed on a hard immobile table with only a small firm pillow under his head (Fig. 2). A block three inches high and 10 inches long is placed under the Achilles tendon. The magnet is brought to the same level as the coils, and the center lines on the coils and magnet are aligned. While a simultaneous electrocardiogram lead is important in readily identifying the waves of the ballistocardiogram, good clinical results can often be obtained by the ballistocardiogram alone. Gubner[3] has described a method of selective synchronous recording of the ballistocardiogram and electrocardiogram on a single channel when an electrocardiograph lead is hooked up in a parallel circuit with the ballistocardiographic terminals and a rheostat is interposed in series in one of the electrocardiographic lead wires. As the resistance is stepped up (20,000 to 50,000 ohms) the amplitude of the electrocardiographic waves decreases to a point where the QRS appears only as a small spike preceding the ballistocardiographic waves.

Interpretation of the Ballistocardiogram

THE ballistocardiographic waves result from recoil from ventricular ejection which pushes the body footward, and impact of the blood moving in the great vessels (deceleration) which

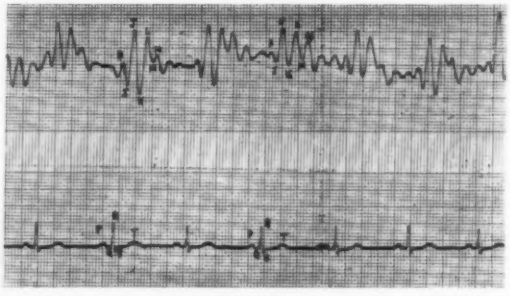

Fig. 3.

moves the body in the same direction as the blood. The ballistocardiograph records the motion due to the balance of these forces. Despite the relation to ventricular ejection, Dock has shown that the size of the ballistic waves cannot be used as an index of stroke volume in the presence of heart disease or disease of the aorta.

The normal tracing (Fig. 3) has three main systolic waves, I, J and K preceded by a small upward deflection, the H wave. The H wave begins shortly after the completion of the R wave of the electrocardiogram and is synchronous with the first heart sound. It is small in comparison to the J wave and sometimes is barely discernible. The record is then sharply deflected downward by the I wave which is probably caused by a footward component of the cardiac recoil accompanying ventricular ejection. It generally is approximately one-half the size of the J peak which is the highest normal deflection. The J wave is an upward deflection which results from the impact of the column of blood on the arch of the aorta. In normal subjects the peak of the J wave occurs within 0.25 seconds from the onset of the QRS complex and usually just before the apex of the T wave. However, in heart disease this interval may be increased so that the peak of the J wave follows the apex of the T wave. The ratio of the I-J stroke to standardization is usually more than 0.5 and is often closer to I. The K wave is a footward deflection due to deceleration as the main mass of blood moves down the aorta. The normal K wave is usually a little deeper than the I wave. In diastole the waves are more variable; the L and N waves usually being present and never approaching the amplitude of the J wave.

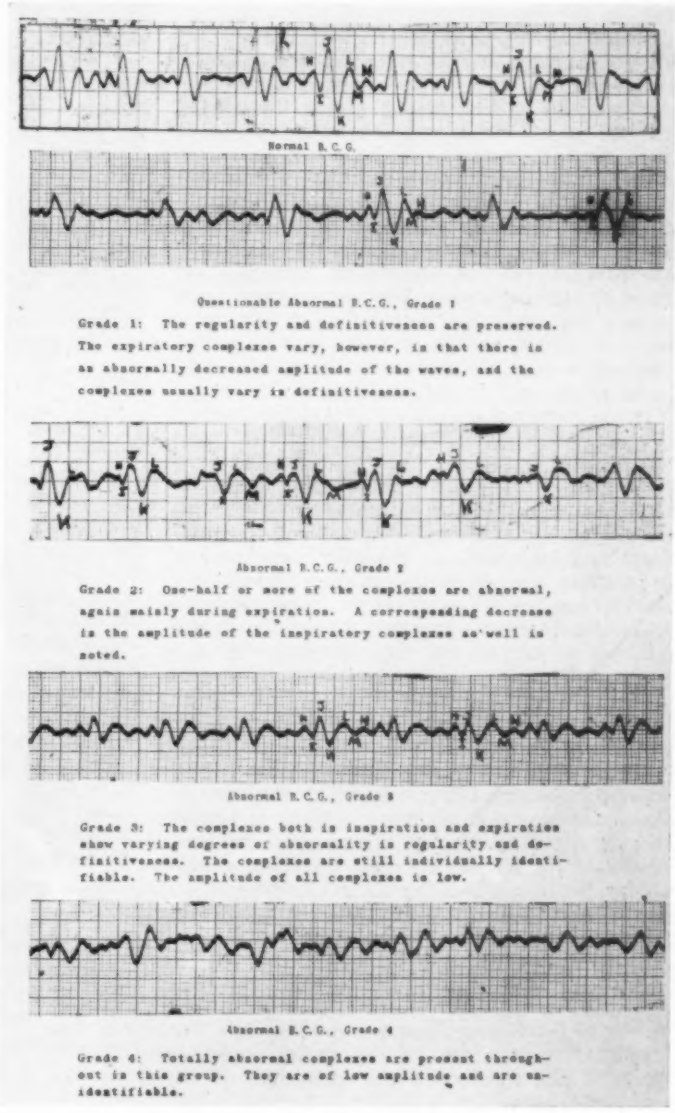
Normal B.C.G.
Questionable Abnormal B.C.G., Grade 1
Grade 1: The regularity and definitiveness are preserved. The expiratory complexes vary, however, in that there is an abnormally decreased amplitude of the waves, and the complexes usually vary in definitiveness.
Abnormal B.C.G., Grade 2
Grade 2: One-half or more of the complexes are abnormal, again mainly during expiration. A corresponding decrease in the amplitude of the inspiratory complexes as well is noted.
Abnormal B.C.G., Grade 3
Grade 3: The complexes both in inspiration and expiration show varying degrees of abnormality in regularity and definitiveness. The complexes are still individually identifiable. The amplitude of all complexes is low.
Abnormal B.C.G., Grade 4
Grade 4: Totally abnormal complexes are present throughout in this group. They are of low amplitude and are unidentifiable.

Fig. 4.
Ballistocardiograph classification by Brown's method.

During expiration there may be as much as 40% decrease from the maximal amplitude in the I-J waves of normal persons. To identify the expiratory phase a pneumogram should be superimposed on the ballistocardiogram. Brown and DeLalla[6] place great stress on the increased respiratory variation of the ballistocardiogram as indicating the earliest evidences of coronary insufficiency. Their recording is made from a fixed apparatus and the ballistocardiogram is taken on a high-frequency table. We realize that the absence of an identifying pneumogram does not allow our graphs with a small portable instrument to be matched identically with those of Brown and DeLalla.

There are no ballistocardiographic tracings pathognomonic of specific diagnostic entities. Certainly there is nothing in the abnormal ballistocardiogram pattern to be compared to the characteristic electrocardiographic changes of coronary thrombosis. Dock states that there is a very high correlation between angina pectoris, myocardial infarction, or scars due to infarction and ballistocardiogram tracings showing complete oblitera-

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tion of the normal pattern. Similar tracings are seen in congestive failure, with low cardiac output, resulting from known severe myocardial weakness. In some badly scarred hearts the amplitude of the J-K wave may be so diminished that on inspection it may not be distinguished from the L-M complex. In such cases a simultaneous electrocardiogram tracing is essential for correct interpretation of the ballistocardiographic pattern. Deep K waves have been noted in hypertension, rigid aorta, and with abnormal I-J waves in severe myocardial damage. Reduced or absent K waves are seen in shock from various causes and in coarctation of the aorta. In cases where the coarctation is successfully relieved by operation, a normal K wave is said to have appeared in the postoperative tracing.

It has been noted that the ballistocardiogram can be normal in essential hypertension, well compensated rheumatic heart disease, and bundle branch block. In a few patients known to have angina pectoris or recovered from a previous coronary thrombosis, a normal ballistocardiogram may be found. In those with angina pectoris it has been shown that anoxemia[3] and exercise[7] may cause the development of an abnormal ballistocardiographic tracing. These experimental findings support Starr's suggestion that one of the earliest alterations in circulatory dynamics in patients with coronary sclerosis is a change in the manner with which the heart ejects its blood.

Under this theory the abnormal heart produces a ballistocardiogram in which the form of complexes is abnormal because there is alteration in ejection velocity. These workers have developed the hypothesis that, in patients with angina pectoris who have normal ballistocardiograms at rest, if these individuals are subjected to stress the ejection velocity is not able to keep pace with demands.

We have found it practical to utilize Brown's classification[8] of ballistocardiograms into four grades of increasing abnormality (Fig. 4). This classification is based on the definitiveness in form of the waves and the amplitude of the complexes, especially in reference to respiration. Grade 4 represents the greatest abnormality and is said by some to be of poor prognostic significance. The portable ballistocardiograph is not as constant as the fixed machines, and a variability of abnormal-normal tracings in individual cases up to 6.3% has occurred in our series. We have, therefore, considered tracings classified in Grade 1 as representing a deviation from the presently accepted normal standards and not necessarily indicating an abnormal ballistocardiogram pattern. Also, it should be realized that the same examiner on different days may not classify identical tracings exactly the same way. To allow a wide enough margin for such variability, we have made it our practice to consider as abnormal only those tracings classified as Grade 2 and above.

TABLE I.
COMPARISON OF ELECTROCARDIOGRAMS AND BALLISTOCARDIOGRAMS BY AGE GROUPS

	Electrocardiograms				Ballistocardiograms			
Age	Normal	Abnormal	Total	Percent Abnormal	Normal	Abnormal	Total	Percent Abnormal
30-34	1	0	1	*	0	1	1	*
35-39	5	0	5	0	3	1	4	25.0
40-44	49	3	52	5.8	38	15	53	28.3
45-49	139	5	144	3.5	65	70	135	51.9
50-54	109	9	118	7.6	44	67	111	60.4
55-59	62	9	71	12.7	8	58	66	87.9
60-64	50	7	57	12.3	5	47	52	90.4
Total	415	33	448	7.4	163**	259	422	61.4

*Not significant.
**Including eight cases with normal BCG in presence of cardiovascular disease.

Clinical Application

FROM January 1, 1950, to December 31, 1951, 422 individuals, mainly over 40 years of age, undergoing annual periodic health examination, were studied with the ballistocardiogram and electrocardiogram. There were only five females in this group. In the early stages of the survey, ballistocardiograms were not obtained on all who were examined.

The effect of age on the development of abnormal ballistocardiograms is evident in Table I and a comparison of the incidence of abnormal electrocardiograms with age is also listed. In the 422 cases there were 61.4% with abnormal tracings; that is, Grades 2, 3, and 4. The percentage of abnormality increased with each five-year period rising sharply at 45 years and again at 55 years. This relationship to age is evident in normal persons and is more marked in those in whom cardiovascular disease is present (Table II). In the second year of the study 53

TABLE II.
COMPARISON OF BALLISTOCARDIOGRAMS BY AGE GROUPS
Normal Cases and Abnormal Cases with and without Cardiovascular Disease

				Abnormal BCG			
	Total	Normal BCG		No Disease		Disease	
Age	Cases	Number	Percent	Number	Percent	Number	Percent
30-34	1	0	*	0	*	1	*
35-39	4	3	75.0	1	25.0	0	0
40-44	53	38	71.7	10	18.9	5	9.4
45-49	135	65	48.2	52	38.5	18	13.3
50-54	111	44	39.6	39	35.2	28	25.2
55-59	66	8	12.1	32	48.5	26	39.4
60-64	52	5	9.6	28	53.9	19	36.5
Total	422	163**	38.6	162	38.4	97	23.0

*Not significant.
**Including eight cases with normal BCG in presence of cardiovascular disease.

individuals with previously normal tracings, including a small number with cardiovascular disease, developed abnormal ballistocardiograms raising the total percentage with abnormal tracings from approximately 40% in 1950 to 61.4% at the end of 1951. They present the same age profile as the total group. It should also be noted that five normal persons with abnormal ballistocardiograms in the first year demonstrated nor-

mal tracings in the second year. In one, the improvement was associated with correction of a moderately severe obesity and reversal of an abnormal double standard exercise test to normal. Improvement, but not return to normal, was noted in several who had recovered from an acute coronary thrombosis and in others who had corrected an overweight condition.

Ballistocardiograms classified as Grade 1 were considered as representing a deviation from the normal standard and not necessarily indicating an abnormal pattern. In the two-year period, there were 86 cases classified in Grade 1. The range in age groups was identical with the total study. Fifty percent of those developing abnormal ballistocardiograms in the second year of the study were originally classified in Grade 1. A Grade 1 ballistocardiogram in the presence of obvious cardiovascular disease was noted in five instances.

Because of limitations in our records it was not possible accurately to list the effect of increased weight on the development of abnormal ballistocardiograms in each age group, but in general we found a greater percentage of abnormal ballistocardiograms at every age in those who were overweight.

The Ballistocardiogram in Normal Persons

THE normal group consisted of 317 individuals with a normal history and clinical examination, without any evidence of cardiovascular abnormality. A total of 162 (over 50%) had abnormal ballistocardiograms. These were classified as follows: Grade 2—63%; Grade 3—30%, and Grade 4—7%. The relationship of the degree of coronary arteriosclerosis with age in our population has been used by Dock and his coworkers to explain in part the increasing percentage of abnormal ballistocardiograms in the normal persons over 50 years of age. So far, in a two-year period no cardiovascular complications have developed in this group.

One hundred and forty-eight of these normal persons with abnormal ballistocardiograms completed exercise electrocardiogram tests using the technique devised by Master.[9] If the single "two-step" test gave a normal response, a double "two-step" test was then accomplished, the subject making twice the usual number of trips in three minutes. The criteria for abnormal response were more stringent than those described by Master, namely, that a depression of the R-S-T junction of at least one millimeter in leads 1, 2 and 3 or 0.75 mm in V-4, even if present only in the one minute tracing, was required for a positive exercise test. Depressions lasting beyond one minute or deeper than one millimeter were of even more definite significance. Conversion of T waves and runs of extrasystoles or coupled beats were considered abnormal. Of the 148 normal persons with abnormal ballistocardiograms undergoing the "two-step" exercise test, there were 27 (18%) positive tests as noted in Table III. The double standard exercise test more than doubled the percentage of abnormal response. Unterman and DeGraff[10] feel that the standard exercise test can give a normal response in nearly 50% of the cases of coronary artery disease, and state that the double standard test

TABLE III.
NORMAL CLINICAL EXAMINATION, ABNORMAL BCG, POSITIVE "2-STEP" TEST

						Physical Findings			Fluoroscopy		EKG			BCG
						Cardiac	Aortic	Mitral	Cardiac	Ab-		Standard	Double	
Case No.	Patient	Age	Sex	Clinical Diagnosis	WGT	B P	Enlargement	Murmur	Murmur	Enlargement	normal Aorta	Control	Exercise	Standard Exercise	Grade
1	G E	45	M	Moderate Obesity Quiescent Gall Bladder	2+	N	0	0	0	0	0	N	N	+	3
2	M E	51	M	Moderate Obesity	2+	N	0	0	0	0	0	N	?	+	2
3	W F	52	M	Moderate Obesity	2+	N	0	0	0	0	0	N	N	+	2
4	A H	54	M	Conversion Hysteria (Headache)	N	N	0	0	0	0	0	N	+		2
5	C H	43	M	Anxiety Neurosis	N	N	0	0	0	0	0	N	+	+	3
6	C M	48	M	Normal Physical Examination	N	N	0	0	0	0	0	N	N	+	3 & 1
7	R O	58	M	Moderate Obesity Transient Hypertension	2+	N	0	0	0	0	0	N	+	+	2
8	R W	50	M	Moderate Obesity Transient Hypertension	2+	N	0	0	0	0	0	N	N	+	2
9	W S	53	M	Mild Obesity	+	N	0	0	0	0	0	N	N	+	3
10	W S	59	M	Moderate Obesity	2+	N	0	0	0	0	0	N	+	+	2
11	E S	53	M	Severe Obesity	3+	N	0	0	0	0	0	N	N	+	2
12	R B	55	M	Normal Physical Exam.	+	N	0	0	0	0	0	N	N	+	2
13	D B	41	M	Normal Physical Exam.	+	N	0	0	0	0	0	N	N	+	2 & N
14	G G	52	M	Normal Physical Exam.	+	N	0	0	0	0	0	N	+	+	2
15	W I	63	M	Normal Physical Exam.	N	N	0	0	0	0	0	N	+		2
16	J K	47	M	Normal Physical Exam.	N	N	0	0	0	0	0	N	+	+	2
17	S M	50	M	Normal Physical Exam.	N	N	0	0	0	0	0	N	N	+	3
18	D R	45	M	Normal Physical Exam.	+	N	0	0	0	0	0	N	N	+	2
19	R W	47	M	Diabetes Mellitus	+	N	0	0	0	0	0	N	N	+	2
20	G H	61	M	Emphysema	2+	N	0	0	0	0	0	N	+		4
21	H N	61	M	Transient Hypertension	+	N	0	0	0	0	0	N	N	+	2
22	W P	55	M	Marked Obesity	3+	N	0	0	0	0	0	N	+		3
23	D R	52	M	Normal Physical Exam.	N	N	0	0	0	0	0	N	+	+	3 & 1
24	J W	52	M	Gout	N	N	0	0	0	0	0	N	N	+	2
25	J M	54	M	Normal Physical Exam.	+	N	0	0	0	0	0	N	N	+	3
26	C D	61	M	Normal Physical Exam.	+	N	0	0	0	0	0	N	N	+	2
27	H E	51	M	Transient Hypertension	2+	N	0	0	0	0	0	N	N	+	2

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only slightly increases the number of positive results. It is easily recognized that the greatest percentage of abnormal response followed the general age pattern. Those who developed an abnormal ballistocardiogram in the second year follow-up demonstrated approximately the same percentage of abnormal response to the exercise electrocardiogram test as the total group.

None of the normal persons with abnormal ballistocardiogram and an abnormal "two-step" test developed a cardiovascular complication in the two-year follow-up. In fact, in 10 individuals who had abnormal responses to the double standard test in 1950, there were six whose responses were normal in 1951 following loss in weight and adjustment in the pattern of daily living. In one of these, an abnormal ballistocardiogram also reverted to normal. In two other cases, the single test became normal while the double test remained abnormal.

The significance of an abnormal exercise test, i.e., the double standard test, is still open to debate, but there is evidence to support the idea that it may be an indication of coronary insufficiency. It is recognized that in some individuals even the double standard test is not sufficient to uncover hidden coronary artery disease, and in two cases, each of whom, however, had abnormal cardiac findings described in more detail below, there developed an acute coronary thrombosis in nine and in 11 months after a normal double standard test.

The Ballistocardiogram in Cardiovascular Disease

THE number of cases with cardiovascular disease in this study was 105 all told, of whom 97 had abnormal ballistocardiograms, listed as follows: hypertension—39; non-specific myocardial damage—15; arteriosclerotic aortitis without hypertension—23; coronary thrombosis—11; angina pectoris with normal electrocardiogram—6; and rheumatic heart disease—3. These were classified as follows: Grade 2—53%; Grade 3—31%; and Grade 4—16%. By contrast, in the normal persons those classified as Grade 4 were only 7%. The high correlation of cardiovascular disease and abnormal ballistocardiograms had led to the concept that an abnormal ballistocardiogram is indicative of cardiovascular abnormality. On the other hand, it is known that the ballistocardiogram can be normal in the presence of rheumatic heart disease, hypertension, bundle branch block, and occasionally in a case of excellent recovery after myocardial infarction the ballistocardiogram may show a gradual return toward normal. In this group with cardiovascular disease, there were eight cases with normal ballistocardiograms rechecked over a two-year period with ages spread from 43 to 64 years, listed as follows: rheumatic heart disease—1; hypertension—3; arteriosclerosis of the aortic arch—2; angina pectoris—1; and coronary insufficiency—1. The following case histories illustrate some of the problems posed by normal ballistocardiograms in the presence of cardiovascular abnormality.

CASE 1 (Development of coronary thrombosis):

A white male, 56 years of age, developed a typical coronary thrombosis in November, 1951, with the electrocardiographic pattern of anterior wall infarction. Ballistocardiogram taken six weeks later was classified as Grade 2. Original study in December, 1950, disclosed a Grade 2 aortic systolic murmur without hypertension or cardiac enlargement, and an abnormal aortic arch on fluoroscopy. Original electrocardiogram and ballistocardiogram were both normal. One week later re-check ballistocardiogram was Grade 1, and a double standard exercise test disclosed a normal response without variation.

CASE 2 (Development of asymptomatic myocardial damage on electrocardiogram):

A white male, 47 years of age, had a normal clinical examination in December, 1950. Electrocardiogram disclosed that the amplitude of T waves in leads 1, 2 and V6 was at the borderline of abnormality. The ballistocardiogram was a textbook picture of a normal tracing. At re-check examination in April, 1951, the electrocardiogram disclosed low amplitude T waves in leads 1, 2 and V6 which were now classified as abnormal. The ballistocardiogram was classified as Grade 2 on two re-examinations. The exercise electrocardiogram test disclosed an abnormal depression of S-T segments on both the standard and double exercise test. At final re-check in November, 1951, no further progression was noted in the electrocardiogram and the ballistocardiogram was again classified at Grade 2. This individual has been asymptomatic and carrying on his usual business duties.

CASE 3 (Previous coronary thrombosis):

A white male, 49 years of age, was originally examined in December, 1950, and gave a history of previous coronary thrombosis in 1943. Physical examination disclosed normal blood pressure and a systolic murmur, Grade 1, over the aortic area. Diphasic T waves were present in leads 2 and 3 without any definite Q pattern. In the exercise test there was a normal response to the standard exercise, but in the double test there was an abnormal depression of the S-T V4 beyond one millimeter in the one-minute tracing. Ballistocardiogram was originally classified as Grade 1 and at re-check in one week was described as normal. At re-examination in September, 1951, the clinical findings were unchanged but the ballistocardiogram was now classified as Grade 3.

In the group with cardiovascular abnormality, 47 electrocardiogram exercise tests were done and there were 23 positive results, approximately 50%. In only six cases was the double test required to bring out the abnormal response. Among those with abnormal responses, two individuals developed abnormal electrocardiograms within one year and another developed coronary

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thrombosis within two months of the test. It is interesting that two cases with a normal response to the double standard test also developed an acute coronary thrombosis, one within nine months and the other within 11 months. One, age 56, with an original normal ballistocardiogram was described above (Case 1). The other, a male, 48 years of age, had an original ballistocardiogram classified as Grade 2. Both cases had abnormal physical findings over the aortic valve area. A third case, a male, 42 years of age, with severe hypertension and an aortic systolic murmur, had transient electrocardiographic abnormalities and the ballistocardiogram was classified as Grade 1 on two occasions. The standard exercise electrocardiogram test disclosed only slight depression of the S-T segment. An acute coronary thrombosis developed in six months.

Variability of the Ballistocardiogram

ONE of the main problems in the use of the portable ballistocardiograph has been the abnormal-normal variability in individual cases. Undoubtedly, part of this is due to some unexplained variation in technique and has decreased as we have gained experience with the instrument. It has been noted that variability in the ballistocardiogram is associated with meals and with smoking. However, even in the basal state this variability can occur and has led us to re-check every abnormal tracing. In many cases, we have used this opportunity to accomplish an electrocardiogram exercise test. There were 27 cases, 6.3%, exhibiting this abnormal-normal variability. In five individuals there was a variability between Grade 1 and normal, for those who consider Grade 1 as abnormal. As noted previously, one of these, with abnormal cardiac findings, developed coronary thrombosis in 11 months. In 22 cases, the abnormal-normal variability was from Grade 2, 3, or 4 to normal or Grade 1. One individual demonstrated variability progressing from normal to Grade 4 on one tracing which was approximately one yard in length. Re-check ballistocardiogram in this case was entirely normal. Two of these cases, originally without cardiovascular abnormality, developed electrocardiographic evidence of myocardial damage shortly afterwards. Variability within the abnormal classification is not uncommon, that is, among Grades 2, 3 and 4. Electrocardiogram exercise tests, nearly all double standard tests, in these 22 cases with marked variability revealed five with abnormal responses, a percentage comparable to that in the group of normal persons undergoing the exercise test. In several of these individuals the ballistocardiogram was persistently abnormal on re-check in the second year of the study.

The percentage of cases (6.3%) with variable abnormal-normal tracings is higher than the occasional variability encountered in electrocardiographic study. The significance of this phenomena remains to be evaluated. In some it is undoubtedly due to a technical factor. In others, it is associated with development of persistently abnormal ballistocardiogram tracings. At times, abnormal electrocardiograms have occurred. In any event it indicates that an abnormal ballistocardiogram should be re-checked at least once before final classification is made.

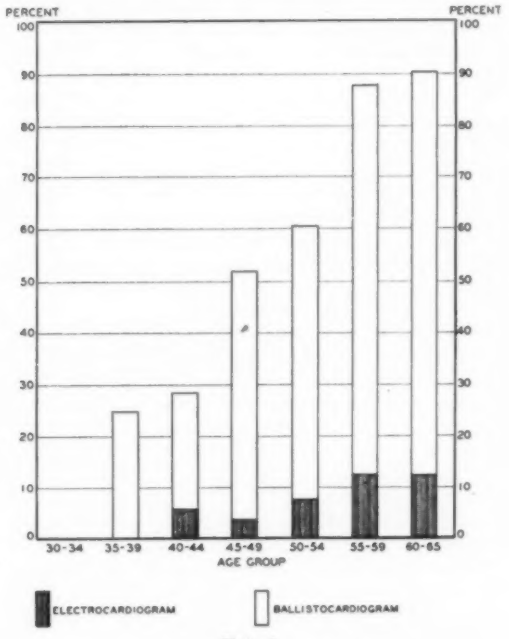

Plate I.
Abnormal electrocardiograms and ballistocardiograms in percent of individual age groups.

Comment

THERE is a high correlation between heart disease and the abnormal ballistocardiogram; 97 out of 105 cases had abnormal tracings. However, our study of 317 apparently normal individuals revealed the development of an abnormal ballistocardiogram pattern with age, the incidence rising sharply at 45 years of age when nearly 40% of tracings were abnormal. Overweight seemed to increase this trend. In a two-year follow-up no cardiovascular complication has occurred in any apparently normal person with an abnormal tracing. It is evident that an abnormal ballistocardiogram by itself should not be the cause for acute alarm. A summary is listed in Table IV.

TABLE IV.
BALLISTOCARDIOGRAM IN HEALTH AND DISEASE
Summary of 422 Cases

Normal Clinical Examination-317		Cardiovascular Disease-105	
Normal BCG	155	Normal BCG	8
Abnormal BCG	162	Abnormal BCG	97
Grade 2	63%	Grade 2	53%
Grade 3	30%	Grade 3	31%
Grade 4	7%	Grade 4	16%
Exercise EKG Abnormal-27	148 18%	Exercise EKG Abnormal-23	47 50%

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What is the significance of an abnormal ballistocardiogram? The correlation with cardiovascular abnormality is admitted but in the absence of such clinical signs, including the electrocardiogram, the factors of age and weight must be considered. In the clinical examination, the finding of an abnormal ballistocardiogram is an indication for a re-check to exclude abnormal-normal variability which was found in approximately 6% of cases, and it is also advisable to perform an exercise electrocardiogram test. The limitations of exercise tests are appreciated, but there is evidence to support the idea that an abnormal double "two-step" test may be an indication of coronary insufficiency. It has been our practice to check the double standard exercise electrocardiogram test in apparently normal persons who have an abnormal ballistocardiogram. When the response is abnormal, we undertake a definite program of regulation of daily living, reduction in smoking when necessary, and correction of increased weight which is often present. In a small number of persons in whom an abnormal double exercise test was re-checked in the second year of the study, six out of 10 became normal and two were improved so that the single test became normal. In one the abnormal ballistocardiogram also reverted to normal. We believe it wise, at this time, to consider the combination of an abnormal ballistocardiogram and an abnormal double exercise test in apparently normal individuals as an indication of cardiovascular disease tendency until further study gives more information on this situation. Subsequent follow-up for a five-year period should prove instructive, and in a 10-year period we may find an increased incidence of heart disease, as suggested by Starr's studies, in apparently normal persons who present an abnormal ballistocardiogram.

What is the value of the normal ballistocardiogram? In the absence of cardiovascular abnormality, a normal ballistocardiogram may indicate that there is no clinically significant heart disease in an individual examined. If this continues to prove true in follow-up examinations it would be of tremendous help in the periodic examination program where the specter of masked coronary artery disease is always present in the apparently normal clinical examination. It should be appreciated, however, that a certain percentage of normal persons, perhaps as high as 10 to 15%, will develop abnormal ballistocardiograms on yearly re-examination, and that after 45 years of age as high as 40% of persons may exhibit abnormal tracings.

The limitations of the portable ballistocardiograph are partly technical and to a large extent clinical. We cannot fully evaluate the significance of the abnormal ballistocardiogram at this time. Definitely, it cannot be compared in significance to the abnormal electrocardiogram. To the practicing physician the value of the ballistocardiogram at present is limited to the normal

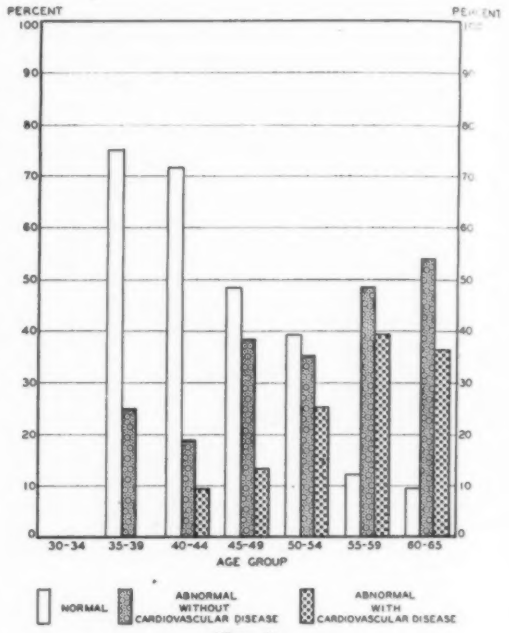

Plate II.

Normal and abnormal ballistocardiograms in percent of individual age groups.

tracing in the absence of clinical signs of heart disease. To him it will be most useful in the periodic examination of the so-called normal person. It may serve to differentiate other chest pain from angina pectoris. In industry the normal ballistocardiogram may be of aid in the selective placement of individuals with essential hypertension. The limitations of the ballistocardiogram in a multiphasic screening program are due to the high percentage of abnormal tracings in normal persons over 45 years of age, and the possibility of inducing cardiac neurosis which may be augmented by the need to recheck abnormal ballistocardiograms. In common with other laboratory tools, it does not replace the diagnostic acumen of the physician.

Summary

THE ballistocardiogram in normal persons develops an abnormal pattern with increasing age, becoming most significant at 45 to 50 years of age when nearly 40% of tracings may be abnormal. This trend is increased by overweight.

In the presence of cardiovascular disease, nearly 90% of tracings may be abnormal. Despite the high correlation of cardiovascular disease and the abnormal ballistocardiogram, the presence of an abnormal tracing in an apparently normal individual is not cause for acute alarm. However, it has been suggested that over a period of years there may be an increased incidence of heart disease in these individuals. We feel that the combination of an abnormal ballistocardiogram and an abnormal exercise test

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in so-called normal persons may be an early sign of cardiovascular disease tendency, and use it as an indication for definite health counselling including weight reduction. A normal ballistocardiogram in the absence of clinical abnormality is of value in that it apparently excludes masked cardiovascular disease. The limitations in the interpretation of the significance of an abnormal ballistocardiogram are due to inability, at this time, to exclude the changes associated with age and increased weight. At times, technical difficulties can cause an abnormal-normal variability in individual cases up to 6%. Follow-up study in the next decade should reveal more information about the significance of the abnormal ballistocardiogram in apparently normal persons.

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Heart Throbs and Occupational Hazards

FEW citizens beyond the perimeter of the Police and Fire Departments will mourn the death of that bill which would have made heart disease a line-of-duty occupational ailment among Richmond's gendarmes and smoke eaters. Men who had no heart ailments when hired by the city, but who developed them later would have been entitled, under the bill, to compensation benefits. Wisely, it seems to us, the Senate Committee on Counties, Cities and Towns killed this proposal. The measure's proponents argued that the sudden shocks, excursions and alarms to which policemen and firemen are exposed exert severe strains on the hearts of these men and that therefore heart ailments should be recognized as an occupational disease. Without in any way attempting to minimize the real perils and unexpected shocks to which policemen and firemen are subjected, we would observe that sudden alarms and heart-thumping episodes are not visited upon policemen and firemen alone. If the shock of responding to a riot call is an occupational hazard for a policeman, why isn't the shock suffered by a salesman, arrested for some traffic violation while driving on company business, equally an occupational hazard? It is almost impossible to separate those jolts received by the heart in the workaday world from those it absorbs at other times. The act of crossing a street at a busy intersection may be as wearing on the circulatory system, for all we know, as responding to a fire alarm. No one seems to have measured the harmful effects on the heart of the arrival each month of envelopes with those little transparent windows in them. That can be pretty wearing, too. If the life of a policeman or fireman were a continuous round of excitement, that bill might have had some merit. But the bill has none, and the committee's *coup de grâce* was much in order.

—*Richmond, Virginia, News Leader*, February 25, 1952.

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Personality Appraisal of the Injured

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THIS is a study of the ambulant individual who has sustained minor trauma and of the physician who treats him. Its purpose is to record some impressions obtained from the observation of behavior reactions in a large number of cases which present themselves at the dispensary of a large industrial hospital, and is given here with the thought that something valuable might ultimately be derived from an understanding of psychological factors operative in both the patient and the attending physician. The possibility of developing techniques for the prevention of disabilities arising from emotional disturbances was one objective of the study.

After the observational data had been collected it was found that the clinical phenomena could be separated into groups according to the predominant behavior patterns. Many of the patients manifested reactions belonging to more than one of these groups. As the study is not intended to be statistical, we offer only a few representative cases in each category which could be recognized as typical mental mechanisms.

GROUP I: CASE I. Contusion, left first toe, M.G., age 35, male. Walks into room saying: "I want you to look at my toe." Though the doctor is silent, M.G. then sits on chair and starts to remove his shoe, speaking with a sheepish grin. "Yesterday," he says, "I dropped a wrench on it." As he removes his sock he gently squeezes the toe between his thumb and index finger, then strokes it with his finger tips continuing up the foot, then pats it. He lifts the foot closer to the doctor, and invites minute inspection of a black and blue area 1 cm. dia., then wriggles the toe with an expression of mixed anxiety and satisfaction which increases when the doctor palpates the member.

CASE II. Contusion and abrasion, dorsum left hand, T.G., age 27, male. Comes into room carefully cradling his left hand in the upturned palm of the right. He sits down and then lifts the left hand with the right, placing it gently against his right cheek. In this position he explains that he forcibly bumped the injured member against the edge of a table.

CASE III. Abrasion, both knees, C.B., age 38, female. Walks briskly into the room, sits down in chair and intently regards the abraded knees, touches them gingerly, then strokes, pats and kneads the calves of her legs. She appears to have a good deal of anxiety, which is considerably relieved when the doctor closely inspects and handles the injured parts. She seems to pay no attention to what he is saying, but continues to stroke and ogle her calf.

Narcissism

THESE three cases represent a type of behavior-reaction which was regularly seen over and over again in numerous cases of injury, and it gradually became apparent to us that the patient acts as if he were in love with his own body, especially with the traumatized area and adjacent parts. He looks at it lovingly, strokes it, pets it, squeezes it, fondles and caresses it, even touches it to the lips in a kiss-like gesture. All of this fits in well with the psychological concept of narcissism, or self-love. According to Freud ("On Narcissism," Coll. Papers IV) the word *narcissism* is used "to denote the attitude of a person who treats his own body in the same way as otherwise the body of a sexual object is treated; that is to say, he experiences pleasure in gazing at, caressing, and fondling his body." When the human being first comes into the world he is endowed with the capacity of loving only himself. "King baby" is the center of his own universe, and his capacity to give love and real interest to people and objects outside himself occurs to a large extent only after long years of evolution and development. Under conditions of stress the infantile patterns of functioning tend to be resumed. The ill (or injured) individual is familiarly known to be self-centered, interested only in himself and his suffering. He apparently withdraws his interest from people and objects in the external world back into the self of babyhood. "So long as he suffers he ceases to love." He directs his feelings toward his own body, accenting particularly the diseased or injured organ. "Concentrated is his soul," says W. Busch of the poet suffering from toothache, "in his jaw-tooth's aching hole." Our own observations revealed evidences of such narcissistic regression much more often than its absence. Narcissism seemed pathogenic only when of excessive intensity, excessive duration, or when elaborated and organized into a neurosis.

GROUP II: CASE IV. Contusion of sternum, C.G., age 44, male. Enters room in apparent distress, clutching his chest. "I was using a wrench when it slipped hitting my chest. It hurts terrible. Do you think I broke my breast-bone. I may have hurt something inside." After careful examination he is informed of the negative results and is at once visibly relieved. He departs all smiles, and with profuse thanks. He returns several times for what he calls a "re-check."

CASE V. Strain, right ankle, E.F., age 18, male. Enters room limping and weeping. "I was walking along the floor and turned my ankle. I feel

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dreadfully afraid, I don't know of what. Help me." After learning that physical examination including x-rays reveals nothing, he departs smiling and without much limp. The next day he returns with expressions of anxiety. "My ankle is terribly swollen." Examination reveals an almost imperceptible amount of edema, which has disappeared by the next day. For the next three weeks he returns nearly every day to discuss his injury and to be examined. He always departs visibly relieved.

Dependency

FREQUENTLY the slightly injured gave the impression of a frightened small child running to mommy, crying with a stubbed toe or a skinned knee or a stomach-ache. In effect he was saying, "Please take care of poor helpless little me. I am utterly dependent upon you; without your help I may die." Extreme reactions of dependency were not the rule, but a certain degree of regression to this type of childish behavior is observable in almost every patient who visits a physician for any injury or illness. It is implicit in the ordinary doctor-patient relationship, and we regard it as abnormal only if present in an exaggerated degree. A study of repeat visits made it seem obvious that certain individuals obtained some sort of pleasure out of their dependency upon the physician, as they maintained the relationship long after it was logically justified by the nature and extent of the injury. Deeper investigation of some such cases revealed personality structures demanding unusual amounts of love and appreciation.

GROUP III: CASE VI. Contusion, left thumb, A.P., age 40, male. Strides into room with clenched teeth and set jaw, saying angrily: "Yesterday I hit my thumb with a hammer. Why does it still hurt. It shouldn't still hurt. I wouldn't of got hit if the boss hadn't been pushing so hard and if the lights weren't so bright. It wasn't my job to use the hammer anyway. I ought to have an x-ray, and if there's anything wrong with my hand I'm going out on lost time no matter how long it takes to get well."

CASE VII. Contusion and abrasion, right shin, B.K., age 28, male. Presents a hostile, defiant attitude. "I stepped into a hole two feet deep; I might have killed myself. There should have been a guard around it. What are you going to do about it? The safety department isn't on the job. I'm lucky not to break my leg; maybe it is cracked. If it is I want my own doctor. The company should pay me for this." When asked why he wasn't looking where he was going he becomes angry.

Aggression

AGGRESSIVE-dependency" was a common and somewhat more complex phenomenon. In these cases the employee presented himself to the industrial physician with a hostile or sullen attitude, as if to say: "I am hurt, and it is all the fault of the wicked company, and of you, its representative. Now you've got to take care of me, maybe forever. I am really angry at myself for perhaps causing this accident, and for being careless, weak, and unable to protect myself from this injury. I was a little mad at the company even before the accident, and now it is easy to direct my anger at you. I may even have, unconsciously, caused the accident by turning my aggression inwardly upon myself, and now my feeling of fear and guilt is relieved by blaming you instead of me."

Temporary mild manifestations of this kind occurred in the otherwise normal individual, but aggressive-dependency if at all intense seemed pathological. These were the patients most prone to develop "traumatic conversion hysteria" and so-called "traumatic neurosis," conditions which represent, of course, grave disability to the patient and serious economic liability to industry and society.

The following is a good example of this type:

CASE VIII. Sprain (?) both wrists, A.T., age 35, female. Four years ago she slipped while going upstairs, falling forward on both hands. Presenting herself at the dispensary with dirty clothes and a torn stocking, she struck a defiant hostile attitude. Her complaint was pain in both wrists and failure of the company to sand the icy steps. Examination, including x-rays, revealed no objective findings. The next day she complained of much swelling of the hands (which could not be objectively confirmed) and of intense wrist pains. The following day she indicated a resentful dissatisfaction with the company doctor and went to her current family physician. During the subsequent four years she visited 15 general physicians, various specialists, chiropractors, naturopaths, etc., none of whom ever discovered any organic basis for her continued complaint of numbness, swelling and stiffness of the fingers and restriction of shoulder movements which developed within the first year. The most careful examinations by experts have failed to reveal any true structural basis for her symptoms. A competent neurologist reports, "characteristic hysterical glove and stocking hypesthesia"; the orthopedist reports, "no objective joint or muscle pathology"; the internist, "no endocrine, metabolic or other organic disorder."

For three and a half months after the accident the patient worked at her regular job of making minor repairs on electrical appliances. Thereafter she worked irregularly, and has received 50% compensation disability payments. She actually produces nothing valuable to industry. Her deep aggression manifests itself from time to time. After a dispute with her foreman: "I said, 'Why don't you drop dead?' and the next morning he did drop dead and people still talk about it.... When Dr. C. said my trouble was all emotional I got so mad I wanted to bop him

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on the nose .... I bitterly resent the 'insinuation' that my trouble is not physical." She strongly resists revealing anything of her personal life, yet unwittingly discloses numerous areas of strong guilt, particularly in relation to her poorly concealed mixed feelings of love and hostility toward her adolescent son.

Physiotherapy of various types applied to the hands and shoulders continuously over a period of four years has served firmly to fixate the neurosis of this individual, who is obviously afflicted with a well developed conversion hysteria following minor injury.

Study of a number of similar cases suggested that the person whose emotional structure has previously been relatively stable may react to trauma with the temporary use of primitive defense mechanisms, but quickly resumes normal mature functioning with the employment of realistic and logical adult measures of treatment for his injury. But it is otherwise where the previous level of emotional functioning has been inadequate because of unresolved inner personal conflicts, anxieties, feelings of guilt, and other evidences of emotional immaturity productive of unpleasant inward sensations. These are the individuals whose unconscious mind seems to say: "My feeling of guilt concerning the accident was relieved by blaming you instead of me. Now all of the guilty feelings related to my deeply personal life can also join the current directed toward the company and (or) the doctor, relieving me still further. All of my anxieties, resentments, and other unpleasant inward sensations with which I have been so long fighting a losing battle can now be discharged and my unbearable tensions relieved. A conversion-hysteria or 'traumatic neurosis' is an unhappy and disabling state of affairs, but to me it is far more tolerable than my 'pre-injury' situation. Despite the unpleasant symptoms, I will now have a channel not only for relief of intolerable aggressive tensions, but also further gratification of my childish dependency-yearnings. I hope to receive equivalents of parental love—physical care by sympathetic mother-substitutes (nurses) and compensation money (father-surrogate). In this clever fashion I satisfy both my hatred and my love needs. I am really all mixed up." Apparently these are for the most part unconscious mental processes of which the patient is largely unaware.

Anxiety

GROUP IV: Observation of the injured always revealed the presence of some degree of anxiety. We are reminded by Freud, in "The Problem of Anxiety," that the basic functions of the psychic apparatus consist of the reception of stimuli and the discharge of excessive amounts of stimulus-excitation by appropriate motor action. By this means the organism is ordinarily defended against the accumulation of harmful quantities of excitation.

When such an accumulation does occur, it is perceived by the individual as inward feelings of tension and anxiety, and the psychological mechanisms of defense swing into action. In so doing, many symptoms including the narcissism, dependency, and aggression, etc., which we have observed clinically, are produced as the patients' emergency response to the "danger" situation. Ferenczi, in "Two Types of War Neurosis," mentions excessive self-love (narcissism) after trivial physical trauma, and states, "the result of such a psychic shock may quite well be a neurotic regression, i.e., a relapse into a phylo- and ontogenetic stage of development long outgrown." He then says, "apparently outgrown phases never quite lose their power of attraction, and on the occurrence of a favorable opportunity always reassert themselves."

The evolution of the narcissism, dependency, and aggression, which we have observed and described, obviously follows along such lines. Our patients behave much more like small children than like reasonable adults.

At the onset of trauma, according to Fenichel, "Clinical Psychoanalysis," the organism is flooded with stimuli in excess of the amount to which it can adjust by its normal mechanisms of logical evaluation and mature rational defense. The overwhelmed psyche, finding itself unable to function at its normal level, therefore regresses to a more primitive mode of action, the depth of the regression depending upon the intensity and quantity of traumatic over-stimulation and consequent psychic disorganization. The observed dependency-reactions fit well into such a construction.

In "Anxiety, Trauma and Shock" (*Psychoanalytic Quarterly*, 1951), Stern points out that stress of any kind produces, first, a local reaction to injury, and, second, manifestations of systemic damage. He states: "Examination of the phenomenon of anxiety confirms the existence of a relation between organic and psychic mechanisms, of an interaction between psychic and physical energies. Every stimulus represents a demand both on the psychic and the physical apparatus. The somatic system is subject to changes from psychic as well as from organic processes." He considers post-traumatic aggression as a very primitive mental response not unlike the familiar "sham rage" of the decerebrate animal when stimulated, representing an "automatic" defense-reaction almost like a reflex arc.

We found all of these regressive primitive mechanisms to be important clinically only when they lost their temporary character and became intensified, prolonged, and elaborated. Assuming the existence of a normal capacity for mental functioning before the accident, we would expect the influx of stimuli to be quickly mastered after trauma by the usual defensive mechanisms, with the resumption of the previous level of functioning.

Our few intensively explored patients have

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convincingly demonstrated to us the presence of pre-existing psychopathology in each case of failure of rapid mastery. Elaboration of narcissism, dependency, and aggression into conversion hysteria or "traumatic" neuroses has always occurred in individuals whose mental structure was already under great stress resulting from the endogenous excitations of severe unconscious personal conflicts, guilt, and anxiety. These persons seemed gladly to seize upon their minor accident to bolster their weak defenses. They frequently denied the existence of pre-existing emotional difficulties, but careful study invariably revealed personality structures originally overloaded with internal tensions. The influx of additional tension then triggered off the breakdown of the whole organization, the pieces of which became rearranged in the new infantile pattern of a frank neurosis.

Psychology of the Physician

IN THE case of relatively normal individuals we noted that regressive modes of behavior appearing immediately after injury tend spontaneously to disappear after a short time interval, with more or less complete restoration of the previous level of psychic functioning. We obtained the impression that the attitude of the physician at times contributed significantly toward acceleration or delay of primary recovery. It apparently can even determine whether the balance will swing toward recovery or toward permanent disability in cases where the patient's adjustment was originally precarious. The doctor's own narcissistic and dependent tendencies may be so great as to produce within himself a sympathetic identification with the patient. The latter senses the doctor's anxiety and uses it to augment his own, thereby producing intensification and prolongation of the symptoms. The physician who understands what is going on in the patient as well as within himself can more easily be objective in his sympathy, thus avoiding mismanagement based upon his own anxiety. An overly anxious physician may thus actually injure the patient.

Perhaps a more common response of the physician to seemingly exaggerated complaints following minor traumata consists of mixed feelings of aggression, anxiety, resentment, and contempt, all directed toward the patient. It is well known that feelings of this hostile order are fundamentally defense reactions, and the question arises as to what is the exact nature of the threat to his welfare from which the physician is protecting himself in this emotional manner.

The precise and detailed solution of this problem would require knowledge of the physician's entire personality structure, including his inner feelings of anxiety and guilt. If he is a little uncertain and insecure within himself he may become defensive when confronted with a situation that he does not quite comprehend. In this case an insight into the psychological mechanisms behind his own and the patient's behavior should again enable him to adopt a more objective attitude and drop the need of defense and counteraggression toward the patient.

The unoriented physician may tend to lump together all behavior which he does not understand into the single classification of "malingering." The neurotic almost invariably exaggerates and overemphasizes his symptoms, but pure malingering is not common. The uninformed physician may use the diagnosis of "faking" as justification for projecting his own poorly suppressed sadistic impulses upon a person who is in reality ill. His sadism may take the form of overt contempt and brutality, or may employ the more subtle guise of "necessary" painful injections or dangerous manipulations, or "exploratory" operations, etc. All of these reactions we have personally observed in ourselves or in other practitioners.

The following is quoted from the medical report in a typical case:

CASE IX: Contusion, left wrist, B.K., age 32, female. The medical record of Mrs. B. K. is an interesting study of the development of a totally disabling neurosis out of a simple contusion of the wrist in a pre-disposed individual. When a patient who is working and earning a living sustains a minor injury and ends up a totally disabled wreck while under constant medical supervision, it seems reasonable to inquire as to whether any errors have been made. A particularly striking impression of the record is the apparent uncertainty and confusion among the various doctors as to the diagnosis. Surely any existing anatomical basis for the symptoms should have been discovered in nearly two years of treatment and study averaging three to five times a week. Dr. A. treated Mrs. K. for at least a year, several times weekly, for "causalgia" or "reflex sympathetic dystrophy," despite the acknowledged absence of all physical signs of this disorder and despite the positive statements of neurologists, Dr. B and Dr. C., that no causalgia was present. Then, over a year after the accident, Dr. A. states: "This patient's course now suggests a left scalenus anticus syndrome, and it appears a scaleneotomy is indicated," thus admitting that he had been treating her for many months for a condition which did not exist. The record indicates that several other doctors had previously considered scalenus anticus syndrome, and though none was able to discover any definite evidence of its presence, Dr. A. was now perfectly willing to subject the patient to this rather major operative procedure.

Finally, about two years after the accident, Mrs. K. was referred to a psychiatrist, Dr. X., who reported the diagnosis as "anxiety state and conversion hysteria, post-traumatic."

Dr. B.'s original report gives the diagnosis as, "left cervical brachial pain of undetermined origin," and his second report, about a year

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later, still gives no diagnosis but states: "It is difficult to understand why this young lady continues to have such disabling pain in the left arm." In both reports he mentions the presence of certain neurotic symptoms, such as apprehension, depression and palmar sweating, but he seems completely to overlook the possibility of significant psychogenic factors in the production of her pain. It is difficult to understand how Dr. B. could expect a scaleneotomy to cure this woman who presents so many evidences of a neurosis but no real evidence of either scalenus syndrome or sympathetic dystrophy. Dr. A. has gone from one diagnostic error to another by first insisting on causalgia and later changing his mind and agreeing with Dr. B.'s confused conclusions. He does not appear to have even considered psychogenic factors in this case which is so obviously a clear-cut conversion hysteria.

The mechanism of the formation of a "traumatic" neurosis following minor injury is well established in modern psychiatric literature, and this case fits nicely into those formulations. Study of this individual demonstrates that she was not in good stable emotional equilibrium at the time of the accident, and that she was unable to compensate normally for the anxiety aroused by her minor injury. Instead, she defended herself in a neurotic way by developing a dependent need for more and more treatment and reassurance, and perhaps a need to obtain attention by exaggerating the symptoms. Her concern with the injured part became increasingly concentrated with continued treatment, and her "free-floating" anxieties also found attachment to the injured member.

She received whirlpool-bath treatments three times a week for three months during which time her attention became gradually fixed upon the wrist and arm. If something could have been done during this period to alleviate some of her deeper anxieties, it seems likely that they could have fairly easily been detached from the injured area and a normal emotional equilibrium quickly re-established. Good psychiatric casework followed by brief psychotherapy would have had a good chance of preventing further disability.

This was not done, but instead there followed many months of repetitious physiotherapy, as often as five times weekly, hospitalization, stellate block, scalenous block, innumerable punctures and tests—all culminating, finally, in scaleneotomy. These measures have, of course, encouraged the firm fixation of the neurosis, which is now a full-blown major disability. Intensive, deep, prolonged psychotherapy might undo the psychic damage inflicted by the previous harmful modes of treatment, but it seems likely that some permanent impairment would even then remain. Only the future can reveal whether her recent marriage will have produced favorable modifications in her psychic economy, but the ultimate outlook does not seem good. She is not now a good subject for any kind of psychotherapy; a tremendous amount of time, effort and expense would be required even if she could be persuaded to accept this kind of treatment.

I believe that more emphasis should be placed upon the avoidance of contra-indicated measures and on the use of prophylactic psychotherapy early in the development of such cases.

Great damage to patients may result from either willful or ignorant failure to differentiate between the symptoms arising directly from anatomical derangement and those representing the psychological response to the trauma. Our observations indicate that undue prolongation of physical therapy or the performance of unnecessary operative procedures actually encourages the development of so-called conversion-hysterias and serious traumatic neuroses by fixating the patients' mind upon the injured area over long periods of time. If these employees are to be spared possible years of suffering and disability, it is the doctor's responsibility to make an accurate diagnosis, provide reasonable physical care, avoid contra-indicated procedures, and institute appropriate psychotherapy where required. (Group therapy might be feasible where a considerable number of individuals are involved.)

We occasionally have seen the important, but fortunately rare, cases of the physician who keeps patients coming back for unduly long periods, perhaps years, of repetitious physiotherapy and who subjects them to questionable minor or major operative manipulations. This sort of physician is a guilt-laden narcissistic individual whose infantile self-love and greed becloud his medical judgment. He requires gratification regardless of his patients' real welfare, and his brutal disregard for their best interests betrays hostility and aggression on a deep psychological level. His behavior continuously inflicts additional psychic trauma upon patients whose tolerance of trauma is already low, and in this manner he may become the actual inciter of a neurosis. Moreover, this type of mismanagement encourages prolongation of the neurosis, which may then remain permanently fixated in the psyche of the unfortunate patient who is meanwhile deprived of his opportunity of being cured by appropriate psychotherapy.

The following final rather spectacular case is presented in some detail because of its importance in illustrating many of the factors under consideration:

CASE X. Contusion and laceration, left leg, M.B., age 34, female. While standing at a bench winding motors, her heels were struck by a motor being dragged along the floor by a porter, pushing her left leg against the footrest of a stool. She then walked some distance to the dispensary where she was treated for a contusion of the lower shin with an abrasion the size of a nickel. After treatment she walked back to work and finished the day. She worked all

the next day but complained of some backache. On the third day after the accident she did not report to work because of alleged "severe" pains in both legs and in the lower back. At this time she was excited, anxious, and overactive. She wept and expressed bitter resentment that her foreman made light of her injuries. Two weeks later she returned to work, but stopped again after working five days, complaining of bilateral leg and back pain, and weepingly declared that the nursing and medical personnel minimized the seriousness of her injuries. Examinations revealed only a well-healed minor leg injury.

After six weeks lost time she again resumed work, remaining on the job two months. Then two more weeks of lost time ensued, followed by two months on the job. Absenteeism became more and more frequent, till she finally stopped work altogether 10 months after the original injury. During this period the outstanding complaint was leg and back pains; the outstanding observable symptom, crying spells and a demand to be considered seriously injured. No significant physical abnormality could be detected. Orthopedic consultation elicited the report "possible mild muscle strain aggravated by anxiety."

Eleven months after the accident a psychiatric consultant diagnosed "traumatic neurosis" with insomnia, crying spells, and anxiety. A few days later the patient became greatly excited, attacked her mother, threw furniture, broke windows, and was admitted to a mental hospital where ECT was inaugurated.

Here is a case of a presumably normal individual deteriorating in less than a year into a useless invalid under the very eyes of numerous physicians, following a minor injury. The compensation courts adjudged this a fully compensable condition, and held industry responsible for all the expense.

For the subsequent six years this patient was confined almost constantly behind the bars of various private and state mental hospitals and psychiatric nursing homes. She received a great number of electro-convulsive shock treatments as well as other drastic therapies. Numerous psychiatrists disagreed among themselves whether her symptoms represented psychotic or neurotic manifestations. Under this regime she became steadily worse, her crying spells increased, her resentments mounted; her quarrelsome, whining, aggressive attitude elicited counter-hostility from doctors and attendants, often resulting in cruel and sadistic punishments and misunderstandings. After one ECS treatment she found herself unable to chew solid food, was accused of refusal to eat, was tube fed, and only weeks later she was found to have sustained a fractured jaw during the ECS. She developed an almost uncanny ability to antagonize doctors, nurses and attendants, causing them to lose their objectivity and resulting on several occasions in cruel beatings and confinement in violent wards.

The seventh year after injury found her in a sadly dilapidated mental and emotional condition. Her conversation consisted mainly of complaints about the way she had been treated and expressions of resentment against various doctors and medical personnel. She was subject to crying spells lasting hours or days, and frequent temper outbursts. No delusional or hallucinatory systems were present, and no psychosis could be diagnosed. Nevertheless it was proposed that she be committed permanently to a private closed-ward mental hospital. Industry had been adjudicated responsible for all of her medical expense (plus compensation) and had already spent many thousands of dollars on this case, and was now faced with a private-hospital expense for the lifetime of the patient. At this point psychoanalytically oriented therapy was instituted. She was seen in hour-long psychotherapeutic interviews three times a week at the therapist's private office. Within four months she was able to move into a private family under the supervision of the home-mother. Six months later she was safely driving her own auto and working part time as a telephone operator.

After another year of this psychotherapeutic regime she was no longer under family care but had moved into her own private apartment, where she did her own cooking, etc., and led the life of a perfectly free individual (after having been virtually a captive for seven years). At present she continues her work as part-time telephone operator, acts as Red Cross advanced first aid instructor, and is a member of the Red Cross Motor Corps. In the latter capacity she has toured distant parts of the state for a week at a time with their Blood-Mobile Units acting in full charge of personnel transportation. She is now on the verge of accepting full-time paid employment.

She has had two years of intensive psychotherapy and needs more, but her rehabilitation is obviously well on the way. The therapist feels that appropriate therapy at the beginning could have cleared up this case in a short time, as the effect of the experiences during the years of institutionalization seemed to contribute the largest factor in delaying recovery.

Treatment

TO SUMMARIZE, and supplement what has already been said about treatment, we conclude as follows: In addition to his local anatomical derangement we expect some traumatized individuals to present certain evidence of regressive behavior representing psychological response to the injury. Effective therapeutic efforts to promote recovery and restoration of normal functioning obviously require a type of management based on a competent understanding of the psychological as well as the physical factors. A majority of patients can be expected without special treatment quickly to master the excessive amounts of stimuli with which the psychic apparatus has been temporarily flooded. In

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many cases recovery could be expedited and prolongation of disability prevented by the use of proper supportive measures to tide the individual over the emergency.

The physician may be justified in assuming the role of parent-substitute on a temporary basis, acting as sort of an anchor while the patient is undergoing the psychic readjustments necessary to the resumption of normal functioning. The anxiety which is fundamentally responsible for the symptoms is palliated by the gratification of the patient's newly-arisen childish needs. The impaired part is gazed at fondly and palpated tenderly; magic words of reassurance are spoken; an attitude of friendly helpfulness and personal interest is rightly interpreted in the unconscious of the injured as an equivalent of maternal love; heat-treatment and medication out of a bottle may be equated with services from the mother of infant days. It is of utmost importance that the medical attendant does not add to the patient's anxiety by his own behavior. Neglect or the "brush-off" creates in the patient a feeling of abandonment and further helplessness, but the over-anxious doctor also may harmfully augment the patient's fears by his undue concern and overly cautious prognostications. The employment of counter-aggression could hardly be expected to act as a useful therapeutic measure in combating the unreasoning pathological hostility of the aggressive patient.

The persistence of neurotic symptoms past the acute stage is a clear indication for more extensive psychological investigation and treatment. We feel that this is the time for a thorough psychiatric work-up, preferably by a trained psychiatric case-worker, followed by "brief" psychotherapy at the hands of a properly trained physician. Once a true conversion hysteria or traumatic neurosis has become established there is no alternative except intensive, deep, prolonged psychotherapy. If the condition has been fixated for too long a time the case may remain refractory to any kind of treatment.

Due (in *J.A.M.A.*, July 29, 1951) writes: "It must be honestly admitted that these patients occasionally suffered real indignities at the hands of some physicians who are poorly oriented in terms of a human approach to the patient. I have been placed on record, in testimony to a court, that *poor management* (my italics) of this type in itself represents a source of injury to the patient and that it is therefore compensable .... I have come to the conclusion that many of the compensation cases that terminate in court battles have come to this end through continued episodes of mismanagement .... Psychotherapy is extremely difficult after a case of this type has been complicated to the degree described above."

By the time the patient sees a psychiatrist his whole emotional task is to prove and maintain his illness at all cost inasmuch as relief of pain through psychiatric means would be tantamount to admitting that he was 'faking' all along." Due further states his belief that then only a cash settlement "can release the patient from his need to maintain a stubborn stand against those who he now feels have injured him in a variety of ways."

Freedoms

OUR economic organization is based upon the principle of freedom of choice. As individuals, we oppose any effort to curb our freedoms. The Atlantic Charter, early in World War II, defined four freedoms: (1) Freedom from fear. (2) Freedom from want. (3) Freedom of speech. (4) Freedom of religion. *These four freedoms are available in the county jail.* You have freedom from fear. Your worst enemy can't get to you even to make a face at you. You have freedom from want. Your food and clothing are provided with no effort whatever on your part. You have freedom of speech. You can criticize your jailer, and the law requires him still to feed and clothe you. You have freedom of religion. You can worship or not as you choose. You have perfect security! But you don't have that freedom that men fought and bled and died for. That is the freedom to go where you want to go, to get what you want to get, and to do what you want to do. That is a rather precious freedom. That is the freedom we sometimes lose when we get this thing we call "security." Economically speaking, that is a freedom we express in the competitive price system. It is the key to the other freedoms. It is worth preserving.

—"Price Fixing for Foodstuffs," by EARL L. BUTZ, Purdue University.

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New Anti-Tuberculosis Drugs

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ON FEBRUARY 21, 1952, the attention of the medical world was attracted by the announcement in the public press that drugs of promise had been found for the treatment of tuberculosis. The action of these new compounds had been observed for only four to 15 weeks, an insufficient time to establish whether they were curative in the sense that the pathological infiltration was completely cleared up by fibrosis formation or by resolution of the disease process. A review of the treated cases indicated that clinical improvement was outstanding in almost every case.

Patients who had failed to respond to other forms of therapy showed in most instances remarkable and immediate subjective improvement after receiving these new drugs for a short while. Attitude and appetite improved, temperature dropped to normal, cough and expectoration were markedly reduced; and some of the patients reported that they had almost stopped coughing. In a fair percentage of patients treated, the sputum became negative for the presence of tubercle bacilli. This was the most significant observation. The story of subjective improvement was repeated again and again as more of the drug became available. It was possible that a momentous development had occurred in the long and tedious effort to find a specific drug for the treatment of tuberculosis.

In our present state of knowledge it is not known accurately what can be accomplished therapeutically and chemically by these new isonicotinic hydrazide drugs or if they ultimately will prove of greater therapeutic worth than streptomycin and PAS (paramino salicylic acid). No decision can presently be reached regarding their lasting effects. The apparent curative effects of these new hydrazides must be measured over a long period of time before final conclusions can be reached. Only in this way can it be ascertained whether the disease is merely temporarily suppressed only to reappear at a later date. Several years of observation are necessary in these clinical experiments before arrival at a definite opinion.

The original group of 92 cases were patients at Sea View Hospital, Staten Island, New York City. They were selected for this experimental study as individuals with far-advanced disease and in such poor condition that their chances of recovery were considered to be low. Yet, after instituting therapy with these drugs their physicians observed distinct clinical results.

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According to Drs. Selikoff and Robitzek, in *Diseases of the Chest*,[1] these favorable results were observed:

1. After two or three weeks there was a complete return of temperature to normal.
2. Sputum negativity was noted on 25% of patients in four to 15 weeks, and another 28% presented only occasional positive sputum.
3. Appetite increased; there was improved sense of well-being and weight gain.
4. Cough and sputum volume were reduced in two to three weeks.
5. In four to 15 weeks, cavity closure occurred in two cases; 33 cases exhibited reduction in size of cavity; clearing of exudate occurred 17 times.
6. Simultaneous diminution in several cavities within the same lung was seen three times.
7. Extension of exudate was seen four times and was minimal; one new cavity appeared.
8. Marked improvement was seen in cases of tuberculous laryngitis, tuberculous otitis, tuberculous glossitis.
9. No death occurred due to therapy, and every patient was benefited by treatment.

It is unfortunate that the professional reports were anticipated by over-optimistic newspaper and other publicity. The various investigators and representatives of the drug manufacturers had agreed to announce the results to the medical profession in the April issues of three medical journals, *Diseases of the Chest*, *American Review of Tuberculosis*, and the *Sea View Hospital Bulletin*. It had been agreed generally by science writers not to publish the story until after these publications were off the presses. April had been chosen as the earliest feasible date, as it appeared necessary to observe x-ray changes over a period of time. Actually, improvement in x-ray shadows had not been as notable as the subjective and clinical improvement of the patients. At most, only 15% of the treated cases demonstrated objective x-ray evidence of improvement. The premature publicity had created a difficult situation for patients and doctors alike, particularly since the drugs will not be available in great quantity for several months. Within a few days of the first curative reports, patients began to refuse necessary surgical procedures. Hopes for a quick "cure" on the part of gravely ill patients who cannot obtain the drug have already been shattered. These and other factors argue against the early publicity these drugs received. Something may be said for the announcements carried by the public press, however. They will undoubtedly stimulate more research and may speed the day when additional anti-tuberculosis chemicals will be announced.

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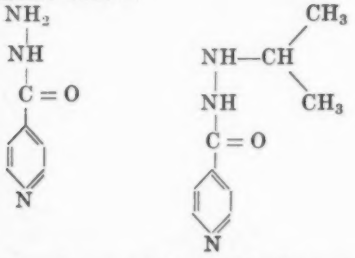
RIMIFON,® which is one of the new anti-tuberculosis drugs, has been on clinical trial since June, 1951. A companion drug, called Marsalid,® also has been applied experimentally. These two drugs were introduced by Hoffmann-La Roche, Inc. Credit for the synthesis of Rimifon and Marsalid has been given to Dr. H. Herbert Fox, a chemist with Hoffman-La Roche. However, a perusal of scientific literature discloses that as far back as 1912 two chemists in Austria had made the drug, now called Rimifon, from coal tar. Unfortunately, its anti-tuberculous qualities remained unknown until the present time. It was reported that Dr. Geoffrey Rake of E. R. Squibb & Co. had synthesized Nydrazid.® Rimifon (Hoffman-La Roche) and Nydrazid (Squibb) are two different names for drugs produced by different manufacturers; but these drugs are identical. They are non-patentable. Chemically, Rimifon is isonicotinylhydrazine, and Marsalid is its isopropyl derivative. Both are hydrazides of isonicotinic acid. The structural formulae follow:



Drs. E. Grunberg and R. J. Schnitzer, senior bacteriologist and chemotherapist chief, respectively, with Hoffman-La Roche, made the initial studies with these new anti-tuberculous compounds and ascertained that they were effective in experimental animal tuberculosis therapy. Adult mice were infected with known strains of tuberculosis germs, both by the intravenous and intranasal routes, and Rimifon showed that it produced a protective effect in small doses when administered experimentally to these infected mice. All untreated controls died. Among the treated animals lesions in the lungs were either absent or the extent of the disease was greatly reduced. Tuberculous lesions of the livers and spleens were absent in the treated animals.

A Macacus Rhesus monkey with tuberculosis was treated with Rimifon. The animal improved, gained weight and activity. Postmortem examination after 10 weeks revealed that the tuberculosis disease had been arrested. Tuberculosis organisms cultured from a caseous lymph node failed to grow on culture.

It was apparent to the investigators at Hoffmann-La Roche that Rimifon possessed anti-tuberculous qualities. It was noted that this same drug did not possess any anti-bacterial power against streptococcus, pneumococcus and Salmonella. It was inactive against influenza virus infection in mice. William Steenken, Jr., and Emanuel Wolinsky, of Trudeau Laboratory, tested Marsalid effects on guinea pig tuberculosis, and reported that they surpass that seen with any other drug or anti-bacterial agent, with the possible exception of streptomycin.

AT ABOUT the same time as the tests described above were under way, the E. R. Squibb Institute was testing various compounds for anti-tuberculous activity and an isonicotinic acid compound related to Niacin, the anti-pellagra vitamin, received attention. The Squibb investigators also noted that in test-tube studies, this hydrazine drug possessed activity against tubercle baccili. Animal tests confirmed this observation. The Squibb drug was given the trade name Nydrazide®, and clinical investigation was carried out by Drs. Walsh McDermott and Carl Muschenheim, at the New York-Cornell Medical Center. As of March 5, 1952, they report that they treated nine cases.

The two research programs above described have been conducted independently, it is reported, and not until January, 1952, did the two groups of investigators recognize that they were testing the same anti-tuberculosis compound. By the time of this writing, the Hoffmann-La Roche hydrazides have been tried on some 150 patients with advanced tuberculosis at the Sea View Hospital, by Drs. Selikoff and Robitzek with beneficial clinical results. The animal experiments which preceded clinical trials indicated that toxic effects were to be watched for, and the possibility of liver damage had been recognized. However, all investigators' reports to date, indicate a minimum of side-reactions to Rimifon. Practically no toxic effects have been noted. The matter of toxicity cannot be dismissed without further study, paticularly with increased dosages and long-continued periods of treatment. Toxic reactions so far recorded have been of little significance and generally transitory. They are: (1) hypereflexia; (2) leg-twitching; (3) constipation; (4) vertigo; (5) reflex disturbance of micturation; (6) eosinophilia in 10%; (7) occasional casts and traces of albumen in urine.

THE discovery of the new hydrazine compounds will be of great importance to industry and to industrial physicians when their worth and freedom from side actions are established beyond peradventure. On the basis of an incidence of one case of pulmonary tuberculosis per thousand workers, it can be assumed that among America's 64,000,000 workers, there are 64,000 latent and undiscovered cases of tuberculosis.

The benefit of a specific, non-toxic, plentiful drug will be enormous when it is considered that thousands of workers undergoing treatment are required to be away from their jobs for months or years. With the aid of these new compounds the period of cure may be shortened materially.

These new drugs alone will not solve the in-

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dustrial tuberculosis problem. There will be a constant need for alertness on the part of the industrial physician to discover early cases of tuberculosis, for case-finding programs, and for early diagnosis on the part of the family physician and general practitioner. Industry stands to gain much from these new hydrazine drugs, but the relentless fight to discover new cases must continue.

How quickly industrial physicians may put these hydrazides into use in the treatment of pulmonary tuberculosis awaits the return from more elaborate inquiry and availability of drug supply. It is now generally felt that, notwithstanding these new chemical agents, the treatment of workers with tuberculosis should be continued along established lines with hospitalization in a sanatorium for open cases. It should be emphasized that the question of whether the new drugs will eventually replace streptomycin cannot yet be answered. There has not been time or a sufficiently large number of cases to ascertain whether the disease process is permanently arrested, whether x-ray shadows clear completely and whether relapse will occur when patients are returned to normal physical activity in their homes and jobs.

The speculation attending the initial reports must now be tempered and the scientific facts appraised in their true light. Are these hydrazide compounds effective specific therapy for tuberculosis or are they merely adjuvant drugs? The preliminary reports possibly demonstrate that Rimifon (isonicotinic acid hydrazide) and other hydrazide drugs mentioned are effective anti-tuberculosis agents. Numerous investigators are now conducting enlarged clinical research studies to determine the toxicity, development of resistance, optimal dosages and desirable duration of therapy. Definitive reports on the long-term effect as regards the clearing of x-ray shadows and infiltrations, together with the effects on the closure and disappearance of cavities, will require many additional months of study.

Commercially the drugs are not yet available for wide distribution. However, 50 milligram tablets are now being produced and will soon be available on a mass production scale. It is anticipated that the Food and Drug Administration will soon permit marketing of these new chemicals so that general use by the medical profession can be hastened. It must be emphasized that the treatment of pulmonary disease due to the tuberculosis organism with these new drugs is still in the experimental stage. No mention has been made as to the cost of these tablets, but it has been estimated that the cost of Rimifon will be less than 25c a day. Since the initial press announcements, six pharmaceutical companies are reported to be producing the new isonicotinic acid hydrazide drugs, and six trade names, quite different from each other, have been applied to them. The Pfizer Company has reported that it will make the drug from citric acid rather than from coal tar products, and will call this anti-tuberculosis product Cotinazin. It has announced plans to produce up to 100,000,000 tablets a month by the end of the current year. Dinacrin and Pyricidin are the names applied by other manufacturers to their products, and these have been sent to South America in large amounts for clinical trial and experimental study.

Even with mass production of the hydrazides, many questions remain unanswered. Some of them are: Are the tubercle bacilli killed within the body tissues as they are in vitro? Statements have appeared that the drugs kill tuberculosis germs in the body within a month. Substantiation cannot be assumed. It is not yet certain that the drugs possess a bactericidal power and that a sterilization effect occurs within the tuberculous lesions. The incidence of relapses after apparent cure must be studied. Sputum cultures must be observed for long periods of time to observe whether viable organisms are present. Verification of the effectiveness of these drugs may take several years. Many scientific—x-ray, laboratory and clinical—data will have to be accumulated before the actual worth of these new compounds can be definitely evaluated.

The necessary long-term evaluation is under way. The manner of healing of the tuberculous process is being investigated. The relationship between the improved appetite and improved nutrition is under study, as it is recognized that improved nutrition must be a factor in the treatment of tuberculosis. Bacteriologists and clinicians who know the unusual characteristics of the tubercle bacillus have felt that the known ability of the organism to develop resistance will play an important part in determining the future therapeutic value of these new compounds. In the past this mischievous organism has always found a method of survival and propagation. It is well to bear in mind that none of the patients so far treated have been discharged as fully arrested or "cured."

References

1. *Quarterly Bulletin of the Sea View Hospital*, Volume XIII, Number 1, January, 1952.
2. *Diseases of the Chest*, Volume XXI, No. 4, April, 1952.

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Trends in Compensation Attitudes

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IN APPROACHING my subject, it occurred to me that it might be helpful to consider some of the background, history and philosophy of workmen's compensation laws in general, and some of the current attitudes, such as those of labor and industry, toward such laws. I say this because I believe that the current legal developments in the field of occupational deafness are to a large degree symptomatic of the viewpoints and attitudes toward workmen's compensation in general, and I think that anyone who is participating in the effort to find a solution for the industrial noise problem should be fully cognizant of these general background attitudes and trends.

We must understand the whole picture in order properly to evaluate occupational loss of hearing, which is merely one small fragment or segment of a much larger problem.

Initially, may I say that workmen's compensation laws constitute the best example I know of the fact that law as such is not merely a means of social control administered by our courts, but is in truth a social phenomenon and an integral part of the broader subject of the relation of the individual to the group, i.e., to society. As Mr. Justice Oliver Wendell Holmes once remarked, "The life of the law has not been logic; it has been experience," and I think that the new conception of law based on social and economic considerations demonstrates that it is a system which must constantly undergo a healthy and vital growth based on the practical needs of our economy.

Another fact frequently overlooked is that often an industrial worker's claim for compensation, whether it be for occupational deafness or for injuries resulting from an accident, is his only direct contact with our legal system, and as a result he is apt to judge such system by what happens in his own case and how it is handled. It has been said that an industrial accident occurs in this country every 16 seconds, and consequently, workmen's compensation is bringing our legal system into the daily lives of countless men and women. While this may be destroying what Wurzel has termed the value of lay ignorance as to our legal and judicial processes, nevertheless, it is making the public more aware of the fact that there is danger in thinking too much of law as a static legal universe, a conception which it has been said emanates from man's youthful and nostalgic desire to eliminate life's uncertainties and to live in a firm, orderly, father-governed world.[1]

Judge Cardozo once observed that "magic words and incantations are as fatal to our science as to any other .... We seek to find peace of mind in the word, the formula, the ritual. The hope is an illusion." The diffusion of knowledge as to our legal system resulting from our workmen's compensation laws may help us to mature by overcoming the childish assumption of the infallibility of such system, for is it not true, as Lewis said in "The Anatomy of Science," that "exact laws, like all other ultimates or absolutes, are as fabulous as the crock of gold at the rainbow's end?"

Purpose of Workmen's Compensation Laws

ONE of the main purposes of workmen's compensation laws, as originally enacted, was to eliminate liability based solely on proof of the employer's negligence, and to substitute a system of liability for accidents regardless of the employer's fault, thereby preventing the injured worker from becoming a public charge.

The philosophy underlying these laws was that liability for industrial accidents should be regarded as a proper charge in the cost of operating the employer's business, thereby transferring the cost of such accidents from the worker and the employer to the consumer. As the court said, in a New York case, the Legislature, in enacting the workmen's compensation law, "put in force the changed concept that the trade product should be charged with all consequences of inherent trade hazards."[2]

Under the old system there was much impatience because of the many cases where no recovery could be had either because no negligence could be shown or because of the difficulty and expense of proving that the employer was negligent. To correct this situation, labor surrendered its right to sue for unlimited damages and the employer surrendered his right to insist on proof of negligence and his right to interpose the common law defenses of contributory negligence and assumption of risk. The theory of the compensation system was that the employer agreed to a certain but limited liability without fault as a cause, while labor

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1. In "Law and the Modern Mind," JUDGE JEROME FRANK suggests this as a partial explanation for what he terms the basic myth that "law either is or can be made approximately stationary and certain" (Tudor Publishing Company, New York, 1936).

2. *Rheinwald v. Builders Brick & Supply Co.*, 168 App. Div. 425 (1915).

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accepted the limited liability because it was certain, because it eliminated speculation or speculative damages and the element of "bargaining," and because it provided, in theory at least, uniform treatment for workers based solely on their wage-earning capacity and the nature of their injury. As Mr. Justice Frankfurter has pointedly remarked, compensation laws serve to correct the "cruel and wasteful mode of dealing with industrial injuries."[3]

Another important feature of the new system was that under it medical care and treatment of the injured worker was provided at the expense of the employer. In short, the system was intended to provide uniform, summary, informal, and prompt relief in restoring some part of the worker's wages or purchasing power which was cut off by the accident. Other reasons which have been mentioned by some writers on the subject include the fact that the new system would eliminate the long delays in court procedures, would take the increasing burden of personal-injury litigation off of our courts, and, last but not least, would avoid economic waste resulting from unnecessary payments to unnecessary lawyers.

Origin of Workmen's Compensation Laws

WHILE our whole system of workmen's compensation is today pretty generally regarded as an indispensable condition of employment, its origin deserves a brief word.

The first workmen's compensation act was a German law enacted in 1884,[4] and in the main it was an administrative law which "set up a self-supporting and self-directing insurance plan under government supervision."[5]

The original British law, enacted later, was somewhat more judicial in nature in that, as originally enacted, it was a "court-administered" law.[5]

In this country labor began advocating workmen's compensation legislation to replace the common-law approach to liability[6] as early as 1897,[7] and the first compensation law in this country was one passed by the Federal government in 1908 for its own employees.[8] This was followed by the first state law which became effective in Wisconsin in May, 1911.[9]

By and large I would say that our American compensation laws are based partly on the German administrative system with some of the aspects of the British judicial system included—in other words, a quasi-judicial system. Under it the workmen's compensation boards of most states not only administer the law but also adjudicate claims arising under it. The system is founded on both social and legal concepts, for in a sense it translates some of the needs of an industrial society into terms of legal liability. In spite of this it is still part of our law[10] and jurisprudence within the broader meaning of those terms.

Growth of the System in the United States

THE first workmen's compensation laws enacted in this country covered only liability for accidents, and in some states, including New York, the enactment of such laws required a constitutional amendment.[11]

This initial coverage was gradually widened in many states to include compensation for occupational diseases, and today there are workmen's compensation laws of one kind or another in all of the 48 states and in all of the territories of the Federal jurisdiction,[12] including occupational disease coverage in 41 of the 48 states.[13]

Occupational disease coverage was at first generally limited to certain specifically enumerated diseases, but in many states, including New York, this has been widened to include any and all occupational diseases through the enactment of what is known as an all-inclusive occupational disease clause.[14] It was under this clause that industrial deafness was ruled to be an occupational disease in New York.

There are still numerous exclusions in coverage. In many states agricultural and domestic workers, employments involving a small number of workers (the so-called numerical exemptions), and employments designated as non-hazardous are not covered, and most railroad and maritime workers and others engaged in interstate commerce remain excluded where the Federal law provides a remedy such as the Federal Employer's Liability Act.[15]

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3. Dissenting opinion in *Wilkerson v. McCarthy*, 336 U.S. 53, 66 (1949), and see his concurring opinion in *Urie v. Thompson*, 337 U.S. 163, 197 (1949).

4. POLLACK, J.: "Workmen's Compensation for Railroad Work Injuries and Diseases." 36 *Cornell Law Quarterly*, 236, 255 (1951) p. 255.

5. DAWSON, M.: "Present Conditions of Workmen's Compensation Laws, and Possible Changes." *Arch. Indust. Hyg. & Occ. Med.*, 3:350 (April) 1951.

6. That the Workmen's Compensation system is a new conception not based on the traditions of the common law prompted Mr. Justice McReynolds to state that "the remedy which the Compensation Statute attempts to give is of a character wholly unknown to the common law, and incapable of enforcement by the ordinary processes of any court" (*Southern Pacific Co. v. Jensen*, 244 U.S. 205).

7. POLLACK, J.: "Labor Looks at Workmen's Compensation." Address delivered at the Thirty-Seventh Annual Convention of the International Association of Industrial Accident Boards and Commissions, Detroit, October 4, 1951.

8. 35 Stat. 556 (1908). 9. Wisconsin Laws, c. 50 (1911).

10. As used in this broader sense, law is that body of rules or principles, prescribed by authority, which society recognizes as binding on its members.

11. As to New York see L. 1910, c. 674, *Ives v. South Buffalo Ry. Co.*, 201 N. Y. 271, Constitution, Art. 1, Sec. 18 (formerly Sec. 19), L. 1913, c. 816 and L. 1914, c. 41.

12. POLLACK: supra, note 4, at p. 257.

13. SYMONS, N. S.: "The Legal Aspects of Occupational Deafness." Presented at Conference on the Problems of Noise in Industry, Atlantic City, April 23, 1951. *Arch. Indust. Hyg. & Occ. Med.*, 5:138-156 (February) 1952.

14. Originally enacted in New York as Paragraph 28 of Subd. 2 of Section 3 by L. 1935, c. 254, and renumbered Paragraph 29 by L. 1947, c. 431.

15. *Cf.* N.Y. Workmen's Compensation Law, Sec. 113. In 1949 the American Bar Association adopted a resolution to submit to Congress an amendment to the Federal Employer's Liability Act now covering railroad workers which would substitute the workmen's compensation acts of the various states for their present right to sue for negligence under that Act (74 A.B.A. 108). The arguments for and against this proposal are elaborately discussed by POLLACK, supra, note 4, and by RICHTER, B. N., and FORER, L. G., in "The Railroad Industry and Work-Incurred Disabilities," 36 *Cornell Law Quarterly*, 203 (1951). POLLACK asserts that because of the

Characteristics and Differences

WHILE the workmen's compensation laws of the various states are not all alike and are not always interpreted alike, I will enumerate a few of their more important common characteristics together with certain points of difference.

In some jurisdictions the action of the commission or board is final and cannot be appealed; in others there is an unlimited right of appeal to the courts.[16] And in a number of states, including New York, the board's decision is final on questions of fact and there is no appeal to the courts except on questions of law.[17]

One fairly common characteristic of most workmen's compensation laws, as indicated earlier, is the fact that in general the remedy which it provides is exclusive and bars any civil action against the employer regardless of whether the employer was negligent or not.[18] This is not true in England today where the worker can bring a common law action for negligence but receives compensation if this action fails,[19] and there is currently some agitation in this country for the adoption of such a system.[20]

In many states the law includes broad presumptions in favor of the claim which must be overcome by the party who disputes the validity of the claim,[21] and there is, generally by a provision in the act itself, a considerable amount of freedom from the restraining influence of technical rules of evidence.[22]

In New York, as in many states, the tribunal is given a power which is possessed by few courts, namely "continuing jurisdiction" over the claim,[23] which means that the jurisdiction continues throughout the life of the injured worker. This is an important power, for it permits closed cases to be re-opened and the amount of benefits paid to the worker to be increased if his condition gets worse.

Many of these provisions are innovations unknown to the common law, and, being innovations, they demonstrate the "ineradicable mutability" of our legal system.

Present-Day Attitudes

I REALIZE that in attempting to express some of the present-day attitudes toward workmen's compensation I am treading on dangerous ground for there is always the possibility that the speaker may, because of his particular associations, be charged with over-emphasizing one point of view or damning the other with faint praise.

Almost every question in the socio-economic field has two sides, and life would be dull without differing viewpoints. Conflict gives us our best opportunity collectively to exercise restraint, to eliminate prejudice and to find solutions which have an equitable and rational basis. Without divergence of opinion our democracy would have little opportunity constantly to recreate the vitality needed for its survival.

In the main I gather the impression from some of their statements[24] that labor believes that the coverage of workmen's compensation should be widened to include all workers not now covered,[25] that the coverage should be unlimited both as to injuries and as to all occupational diseases—hence the spreading demand for awards for occupational deafness—and that the scale of benefits, which in general are limited by fixed ceilings or maximums, should be increased in proportion to the rising cost of living either directly or through some self-adjusting formula which would tie any maximum to increased wages or to the cost-of-living index.[26] Some of labor's spokesmen also assert[27] that the wide variations in benefits payable on a state-to-state basis can only be cured by a single Federal workmen's compensation system with uniform coverage and uniform adequate benefits.[28] Other critics of the present system have asserted that it does not provide the simple, automatic remedy that was intended, that the present approach is still too "forensic,"[29] and that entirely too much litigation has resulted from the "myriad defenses that have been advanced or devised by the ingenuity of compensation carrier counsel,"[30] which recalls to mind

uncertainty and unpredictability of compensation under the F.E.L.A. such law amounts to a "cruel lottery" and has failed to meet "virtually every criterion of a well-designed and equitable compensation system" (p. 269). RICHTER and FORER, on the contrary, assert that "the substitution of the state compensation acts for the F.E.L.A. would be a retrogression" (p. 234).

16. DAWSON: *supra*, note 5.

17. Section 20 of the N.Y. Workmen's Compensation Law provides that "The decision of the Board shall be final as to all questions of fact . . . ."

18. *Cf.* N.Y. Workmen's Compensation law, Sec. 11.

19. RICHTER and FORER, supra, note 15, pp. 207-208, 234; and see Halsbury's Laws of England § 386 (2d ed. 1939) and 34 ditto, § 1318 (2d ed. 1940).

20. GREEN, B. A.: "Compensation", Annual Convention of National Association of Compensation Claimants' Attorneys, San Francisco, August 6-12, 1951. And see RICHTER and FORER, supra, note 15, pp. 234-235.

21. N.Y. Workmen's Compensation law, Sec. 21.

22. Section 118 of the New York law provides that the Board "shall not be bound by common law or statutory rules of evidence or by technical or formal rules of procedure . . . . but may make such investigation or inquiry or conduct such hearing . . . . to ascertain the substantial rights of the parties."

23. Section 123 of the New York law states, among other things, that "The power and jurisdiction of the Board over each case shall be continuing, and it may, from time to time, make such modifications or change with respect to former findings, awards, decisions or orders relating thereto, as in its opinion may be just . . . ."

24. *Cf.* POLLACK: supra, note 7.

25. DOWNEY has stated that "the compensation system should comprise all industries, all persons employed therein and all personal injuries which arise in the course of industrial pursuits" (DOWNEY, E. H.: "Workmen's Compensation," 1924, p. 21).

26. In the author's own community the UAW-CIO has recently referred to "the meagre benefits of the present law," and is urging "a campaign to mobilize the full strength of all labor in the community and state behind a program to improve workmen's compensation laws" (*The UAW Reporter*, Western New York Citizenship Council UAW-CIO, Vol. 1, No. 3, January 8, 1952).

27. POLLACK, supra, note 7.

28. This, of course, involves the broad question of the rights of the states to maintain their own systems of compensation. At the Annual Convention of International Associaion of Industrial Accident Boards and Commissions, in Detroit October 1-4, 1951, the Commissioners of North and South Carolina opposed any further centralization of power in the Federal government and offered a resolution, which was unanimously adopted, that the Association again go on record as being opposed to the federalization of state workmen's compensation systems.

29. DAWSON, supra, note 5.

30. POLLACK, supra, note 4.

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Mr. Justice Murphy's remark that our compensation laws are "deceptively simple and litigiously prolific."[31]

As to industry's attitude, I cannot speak for it any more than I can for labor, and, of course, there are different shades of opinion within both groups. I would say that industry believes fully in the principle of workmen's compensation and recognizes that it is a fair and humanitarian system. It recognizes that reasonable adjustments should be made from time to time in the scale of benefits payable to take into account the cost of living, but believes that they should not be increased to the point where they encourage malingering or put a premium on laziness.

Some segments of industry are rather fearful that through the acceptance of exaggerated medical testimony they are too often called upon to pay for non-existent disability based purely upon unjustifiable or uncorroborated subjective complaints, for non-industrial disability, and for old age incapacity unrelated to any work-connected injury,[32] and they feel that there is a need for better methods of verifying industrial disability.[33] Industry feels that the principle that "more cannot be taken out of industry than is put into it or developed by it,"[34] should not be lost sight of,[35] and that in the determination of the whole question of what constitutes an "adequate award" consideration should always be given to the possibility of the "inadequate resource" out of which the award will have to be paid.[36]

Undoubtedly these differences of opinion can be solved if the "oppositionists" approach the problem with moderation and in a spirit of mutual confidence.

One of the great by-products of the compensation system is the conception of safety in industry, and this presents a challenging field in which both labor and industry can work together for their mutual benefit, and this concept applies to the field of industrial noise. The prevention of accidents and occupational diseases through the elimination of hazards, whether such hazards be unguarded machines, excessively dusty atmospheres or unnecessarily high noise levels which can be lowered, is the surest way to cut down the cost of workmen's compensation. In the final analysis, since the cost of workmen's compensation is passed on to the consumer, the public has a vital interest in all of these broader questions. It is the public which "pays the bill," and in solving any of these problems, including that of occupational deafness, both labor and industry must recognize this fact. The goal should be fair and equitable treatment of the injured worker, but with every effort to keep the cost within reasonable bounds and at a point where it will not penalize the industry which creates the employment opportunities. In this era of lobbies and pressure groups we cannot afford to forget Aristotle's conception of the golden mean.

With this general background in mind let us turn to the specific problem of occupational deafness.

Deafness as an Occupational Disease

IN PREVIOUS papers I have traced the legislative and judicial history of the New York workmen's compensation law leading up to the ruling in New York that deafness is an occupational disease,[13,37] and I will not repeat that history here. The ruling to which I refer was made in the case of *Matter of Slawinski v. J. H. Williams & Co.*, decided by the Court of Appeals in July, 1948.[38] It involved a hammer operator in a forge shop which was conceded to have a high noise level. The claimant's audiometric examination showed a typical case of high-range deafness. There were two main questions in the case, the first, of course, being whether deafness was an occupational disease. The other, and perhaps more important question, was whether the worker was entitled to an award before he sustained any economic loss of any kind, as the evidence was undisputed that he had lost no time from work and had suffered no loss of earnings whatsoever.

As to this second issue the employer and carrier, whom I represented, contended that no award was payable even though the court might rule that deafness was an occupational disease. Our argument was based on a special definition of disability in the New York workmen's compensation law which defined disability in cases of occupational disease "as the state of being disabled from earning full wages at the work at which the employee was last employed."[39] We urged that this language was quite clear and understandable and that it meant that in cases of occupational disease, as distinguished from cases of accidental injury, there was no disability so long as the individual continued to be em-

31. *Cardillo v. Liberty Mutual Insurance Co.*, 330 U.S. 469 (1947). See also HOROVITZ, The Litigious Phrase "Arising Out Of" Employment, 3 NACCA L.J. 15 (1949) and 4 NACCA L.J. 19 (1949).

32. *Cf.* STONE, S. J.: "The Cost of Workmen's Compensation." *The Monitor*, Official Publication of Associated Industries of New York State, 38:2, 19 (July) 1951.

33. Even POLLACK, supra, note 4, has suggested that "better methods must be found or employed for verifying disability" (p. 265).

34. *Cf.* SAYER, H. D.: "The Realities of Workmen's Compensation." Address presented at the Fifty-Seventh Annual Meeting, American Bar Association, Insurance Law Section, Milwaukee, Wisconsin, August 30, 1934.

35. In New York State, industry is fearful that the cost of workmen's compensation which is one of the highest, if not the highest, in the country, is threatening its competitive position in relation to other states where the cost is lower (*Cf.* HORNE, G.: "Is Workmen's Compensation Strangling New York's Industry?" *New York Times*, September 10-12, 1951; and see Associated Industries of New York State *Bulletin No. 33-JJ*, September 18, 1951).

36. SNOW, G. H.: "The Insurance Side of the Picture." Address delivered at the Convention of the National Association of Claimants Compensation Attorneys, San Francisco, California, August 11, 1951.

37. SYMONS, N. S.: "A Lawyer Looks at the Industrial Noise Problem." Proceedings of the Second Annual Noise Abatement Symposium, 2:1951.

38. 298 N.Y. 546, reargument denied in 298 N.Y. 634. To the same effect see *Matter of Rosati v. Despatch Shops, Inc.*, 298 N.Y. 813.

39. Article 3, Sec. 37.

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ployed at full wages in his regular occupation.[40]

Slawinski had been granted a schedule award by the Workmen's Compensation Board, and this was upheld by the courts. It is to be noted that this was a schedule award,[41] i.e., an award for a fixed number of weeks compensation for partial loss of use of function as distinguished from an award for disability based on a diminution of earnings. From information furnished to me I doubt if any special thought was given to the propriety or applicability of schedule awards when the original occupational disease provisions of the New York compensation law were enacted,[42] as, generally speaking, the nature of occupational diseases does not bring the schedule into play. Be that as it may, the New York Act has been interpreted to make the schedule provisions, which are contained in another section of the act, applicable generally to occupational disease cases. This construction is not without a rational basis when one thinks of some of the pathological conditions which often result from occupational diseases, such as wrist drop in lead poisoning, glass worker's cataract producing loss of binocular vision, etc. The net result of the *Slawinski* decision is that the law in New York is now, *first*, that deafness, whether partial or complete, if it has been caused by work in a high-noise level, may be held to be an occupational disease, and, *secondly*, that compensation may be awarded for the worker's physiologic loss as distinguished from any economic loss.

The Question Posed by the Slawinski Decision

THE basic social question posed by the *Slawinski* decision, of course, is: is it desirable to award money to a worker for occupational deafness while he is employed and making as much as his fellow workers? Or would it be better to eliminate these schedule awards, which are merely for loss of function, and to compensate him later when he actually reaches a point where his earnings are decreased because of his condition, or when he can no longer remain on the job because of his deafness? In other words, should not the award be "timed" to the worker's real economic need rather than to give it to him when such need is lacking?

Some segments of labor may not be unaware of the possible validity of this concept, for Jerome Pollack, Consultant of the UAW-CIO Security Department, made the following statement in a recent address:[43] "The principle in determining compensation for permanent partial disabilities, whenever possible, should be geared to the individual's loss of earning capacity." It may be inferred from this that what Pollack is emphasizing is economic rather than anatomic disability.[44]

This is all part of the broader problem as to the relative merits of schedule versus reduced earnings awards in partial disability cases. Theoretically there is no difference between the loss of a leg and the loss of all or part of the function of an eye or ear, and there are some who have suggested that all schedule awards should be eliminated and the worker compensated only when he has an economic loss, although in this connection it might be hard to convince the average employee that he shouldn't be paid if he loses an arm or leg in an industrial accident.

On the other hand from the practical standpoint there is a vast difference between a sudden accident or trauma which results in the loss of a member and the pathology resulting from an occupational disease such as deafness. In the former the etiology is undisputed; in the latter type of case the cause, as we well know, is often obscure and is frequently complicated by non-industrial factors, so that there would, it seems, be far more justification for relating the award in this type of case to the man's loss of earning capacity.

On the question as to whether some degree of occupational deafness among those who work in industries with a high noise level constitutes economic disability, I quote the following statement of William H. Dahmer, Personnel Director, J. H. Williams & Company, Buffalo:[45]

"My experience with this company covers a period of 32 years, and although occasionally an employee has quit his job in our forge department during the first few days of his employment on the complaint that the noise was bothersome, we have never, insofar as I know, had an employee terminate his employment because of actual occupational deafness.

"In fact we have always been very agreeably impressed with the high percentage of former forge department workers who have responded to recall following lay-offs. Occupational deafness, to the extent that it may exist in our plant, does not interfere with the earning capacity of our workers, their productive efficiency, or their ability to perform their assigned tasks and responsibilities."

This basic question of what constitutes disability, and whether it should be compensated on a physiologic or economic basis, is an important one which should be carefully studied by all those concerned with the problem of occupational deafness.

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40. One of the judges in the intermediate Appellate Court agreed with this contention (dissenting opinion of Mr. Justice Foster, 273 App. Div. 826).

41. Computed under Article 2, Sec. 15, Subd. 3, Par. m.

42. L. 1920, c. 588.

43. DAWSON: supra, note 7.

44. Elsewhere POLLACK has stated that "A far-reaching evaluation is needed of the entire procedure governing compensation for permanent partial disabilities. The payment schedules now in general use are arbitrary, inconsistent, and often inadequate. Compensation should be determined according to the individual's loss of earning capacity, taking into account such factors as age and occupation. If the permanent loss does not diminish earning capacity because of the worker's job adjustment, consideration should nevertheless be given to the potential loss which affects other employment and compensation might be provided in such cases according to a schedule" (POLLACK: supra, note 4, p. 267).

45. Personal communication to the author.

Aftermath of the Slawinski Decision

AS SOON as the *Slawinski* case was decided there was immediate increase in the number of claims filed in Western New York embracing the Rochester and Buffalo areas,[46] and this tendency has been spreading to the extent that the potential cost, which might easily run into millions of dollars, has become a matter of concern to industry in the state.[47]

This concern revolved around the following factors:

1. Since practically none of the workers had been given pre-employment audiometric examinations there was no way of telling how many of them had a loss of hearing when hired, or the degree thereof, and, since there is no way of specifically identifying the acquired industrial loss in such cases, industry was afraid that it would be called upon to pay for much deafness for which it was not responsible.

2. In the case of most of the workers, the acquired pathological loss was something which had accumulated over a long period of years. Much of it occurred before deafness was ruled to be an occupational disease, and during a time when industry was setting aside no reserves to pay the claims and the insurance companies were not collecting premiums based on the hazard of industrial noise, and consequently industry was fearful of the financial effect of a sudden avalanche of claims which it was not financially prepared to meet.[48]

3. Industry, cognizant of the continuing jurisdiction provision of the New York act, was also fearful that under the *Slawinski* decision there would be nothing to prevent the worker from filing successive claims every time his hearing loss showed an increase, and it viewed with some misgivings the potential multiplicity of litigation with all the legal and medical expense this would entail.

Subsequent Decisions of the New York Board

SINCE the decision in the *Slawinski* case, the New York Workmen's Compensation Board has handed down a number of decisions which have substantially modified the effect of that ruling. These subsequent decisions involve the question of "permanency."

Briefly, these decisions arose in this way. A number of the claims had been filed in Rochester against the Despatch Shops, Inc., and the clinical experience which developed in connection with these claims showed a considerable variation and fluctuation in the results of the periodic audiometric examinations.[49] Because of this, because of the medical concept of acoustic fatigue which is recognized in the literature as a temporary condition as distinguished from permanent nerve degeneration,[50] and because the New York law referred to *"permanent partial disability,"*[51] further claims were contested upon the ground that as long as the men were continuing to work in the high-noise level the permanency of the condition could not be determined and, therefore, no awards were proper.

The New York Board itself investigated this question by designating Dr. Otto E. F. Risch, of New York City, as an impartial specialist and, after coming to Rochester and examining a number of claimants, Dr. Risch testified, as had Dr. Nash, that it would be necessary for the individual to remove himself from the exposure for a period of at least six months to a year in order to rule out the element of acoustic fatigue so that the degree of permanency could be established.[52]

As a result of this the Board has, with a few exceptions,[53] made a number of rulings in both the Rochester and Buffalo areas finding occupational disease but closing the cases without awards upon the ground that "there is no lost time and no medical proof of permanent defective hearing."[54] The language used in some of these decisions is significant. In one case the Board said that "absence from work may improve his (i.e., the claimant's) hearing just as continuance at work in a noisy environment may worsen it,"[55] and in another, decided on December 21, 1951, they said that the claimant has "an occupational disease which has not become stationary and reached its end result. Under the circumstances, no evaluation may be placed upon such condition."[56]

Most of these decisions specifically provided that the case "was closed without prejudice to the claimant's right to reopen it whenever he has evidence to support such application."[57]

Effect of These Subsequent Decisions

THESE decisions represent, of course, a most interesting development in the field of occupational deafness.

46. BRAIMAN, M.: "The Legal Aspects of Occupational Deafness in New York State." Talk delivered at 37th Annual Meeting of The Self-Insurers Association, New York, December 13, 1951.

47. SYMONS: supra, note 13.

48. In New York State this question has been loosely referred to as involving the concept of "accrued liability." The same problem arose a number of years ago when the state was first flooded with silicosis claims and it was solved by the enactment of liability provisions of the escalator type under which the amount of the award payable was increased by a fixed amount each month until a maximum amount was reached. These provisions have since been repealed and silicosis is now compensated in the same manner as any other occupational disease with the exception that there can be no award for "partial disability due to silicosis or other dust disease" (See Article 4-A, which was repealed by L. 1947, c. 431, and present Sections 3, 13-H, 15, 39, 44, 44-a, 47, 49, 49-a).

49. BRAIMAN: supra, note 46.

50. A number of the medical references dealing with this subject will be found in Note 33 appended to the author's paper on "The Legal Aspects of Occupational Deafness" supra, note 13.

51. Sec. 15, Subd. 8.

52. BRAIMAN: supra, note 46; SYMONS: supra, note 13.

53. *Cf. Ochs vs. General Drop Forge*, Workmen's Compensation Board file No. 85019006, op. 5/16/51.

54. *Petti v. Despatch Shops, Inc.*, Workmen's Compensation Board file No. 74705687, op. 9/29/49; *Grano v. Despatch Shops, Inc.*, ditto No. 74710627, op. 2/16/51; *Verdi v. General Drop Forge*, ditto No. 85016054, op. 12/21/51; *Nowocien v. General Drop Forge*, ditto No. 85021965, op. 12/17/51.

55. *Nowocien* case, supra, note 54.

56. *Verdi* case, supra, note 54.

57. *Petti*, *Grano* and *Verdi* cases, supra, note 54.

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In the first place, in view of the Board's own investigation of the problem resulting from its consultation with Dr. Risch, I am convinced—and I am stating only my own personal opinion—that these cases, which now give every indication of representing a definite pattern or policy on the part of the Board, are in no sense decisions which were hastily made, but that, on the contrary, that they represent careful thought and study of all of the various aspects of the problem.

Under these decisions, while the worker can obtain no award as long as he is still working and earning full wages, his ultimate right to be recompensed for the acoustic damage caused by his occupation is in no way cut off or prejudiced. Under these rulings all of these men will ultimately be entitled to receive an award, but at a time when their economic need will obviously be much greater than it is now.

A second observation is that these decisions would certainly seem to be in accord with principles of sound medicine, for they coincide with the view of that segment of organized medicine which is most familiar with the problem of industrial noise, namely, the Subcommittee on Noise in Industry of the Committee on Conservation of Hearing of the American Academy of Ophthalmology and Otolaryngology. This Subcommittee last June adopted the following statement of policy:

"Hearing loss produced by prolonged exposure to loud noise may be considered as permanent six months following complete removal of the individual from the area of loud noise."[58]

In the third place, insofar as industry is concerned, there is a very practical benefit which will result from this rule if it is consistently followed. Earlier I mentioned the fact that the wholesale filing of claims would have a tendency to put a sudden economic strain on industry to meet which no reserves were built up over the years during which the pathological condition accumulated. If awards are to be paid only after the worker's separation from his employment this acute situation would be ameliorated, for the number of men leaving a particular industry each year would probably not be large, and in this way the economic burden could be spread over the years and could more easily be absorbed without serious financial consequences.

One other matter might be mentioned at this point. There are, in this whole situation, a lot of vastly intricate questions relating to the reserves which have to be put up by insurance carriers underwriting these risks, the effect of such reserves on employers which are subject to experience rating, particularly in cases where there may be a change in the carriers while there are undecided cases pending against the employer, and other matters of a similar nature. I have delved a little into some of these questions and they are extremely difficult for one like myself who is not an actuary or rating expert to understand.

Consequently, it seems that these recent decisions might, if adhered to, eliminate at least some of these difficulties for this reason. If the Board's present policy is followed the worker will not be entitled to an award as long as he is working, and as this fact becomes generally known I would think that the effect would be to discourage the filing of claims until such time as the men leave the noisy employment and can get an immediate award. And if no claims are filed until the awards become payable, the question of reserves largely disappears, for once a claim is paid off no further reserve has to be carried by the insurance company to meet the asserted liability, and the amount of the loss, having been finally and promptly determined in amount, will thereafter be reflected in the experience rating process as applied to the employer involved.[59]

One final word as to these recent decisions of the New York Board. These rulings, of course, represent a solution of the problem on an administrative level and, being based on conflicting medical evidence, they are always subject to change, as, for example, if a new administration, which might disagree with these theories, should come into power. For this reason there are some who feel that if this solution is sound it, or some other solution which will be fair to

58. Quoted in "A Lawyer Looks," supra, note 37, and generally on this subject see medical references in Note 23 in "The Legal Aspects," supra, note 13. In 1950 WHEELER pointed out that the course of recovery is not a linear function of elapsed time, and while at that time he stated that the Sub-Committee had recommended a minimum of 48 hours he was careful to point out that "even longer times may eventually prove to be necessary" (WHEELER, D. E.: "Noise Induced Hearing Loss," *Arch. Otolaryng.*, 51:344 (March) 1950). In "Industrial Noise: Its Effects and Control," BARRON, C. I. (Address presented before the Industrial Hygiene Section, October 31, 1951) stated that "In some individuals, complete recovery of the hearing loss does not occur over a period of months and a permanent defect remains." And in "Effects of Noise on the Ear and Hearing," SHAMBAUGH, G. E., JR., (Proceedings of the Second Annual Noise Abatement Symposium, October 5, 1951) states that "As a general rule, we believe that by far the major part of recovery from auditory fatigue has occurred within 48 hours of exposure to the noise, and certainly any loss still present after six months must be regarded as permanent noise deafness." VAN DISHOECK, H. A. E., and VAN GOOL, J. (in "Adaptatie, Vermoeidheid en Trauma," *Ned. Tijdschr. Geneesk*, 1951, 95/18 (1361), as digested in *Oto-Rhino-Laryngology*, Sec. XI of *Excerpta Medica*, Vol. IV, No. 11, November 1951, p. 413) point out that polarization of the cellular membrane and changes in cell metabolism are responsible for the phenomenon of aural fatigue due to adaptation of the hearing organ to the sound stimulus, that in fatigue the maximum loss is usually found at a higher frequency range and is non-symmetrical in spread, and that "In contrast to adaptation the hearing loss due to fatigue shows definite recruitment and a much longer time of recovery. Adaptation occurs at any stimulus intensity and at any frequency, whereas fatigue takes place only at high intensities and after prolonged periods of exposure." And SALTZMAN, M., and ERSNER, M. S., (in "V-shaped and U-shaped Audiograms," *Eye, Ear, Nose & Throat Mon.*, 30:247, 1951, also digested in *Excerpta Medica*, supra, p. 414) quote experiments to show that the more prolonged the exposure to noise the greater is the time required by the cochlea to recover.

59. For a full discussion of insurance rates and rate making see "Adequacy of Workmen's Compensation," REEDE, A. H.: Harvard University Press, 1947, Chapter XIII. The author states that the essence of the process of experience rating "consists in computing an adjusted rate somewhere between the manual rate and the rate indicated by the experience of the risk concerned" (p. 244).

everybody,[60] should be enacted into the statutory law so as to give such solution a fixed degree of permanence to which industry could adjust its financial program.

Another Complicating Factor

THE whole question of occupational deafness is so complex that it recalls Shakespeare's line in Macbeth, that "Confusion now hath made his masterpiece." There are many complicating factors in the picture, and I want to mention one more of these briefly.

In cases of occupational disease caused by a man's work with successive employers, the New York act makes the last employer liable in the first instance but it also provides for a division of the liability among all the employers whose work is responsible for the condition if the last employer petitions for such relief.[61]

However, it is also the rule in New York that where several carriers successively insure a single employer, the carrier on the risk at the date of disablement is liable, and there can be no apportionment between such carriers.[62] In other words, the insurer at the date of disablement must pay the entire award even though the disease may have been caused in part, or even in large measure, by exposure which occurred while one or more prior carriers were insuring the risk.

As to these loss of hearing cases the New York Board has, in general, found the date of disablement to be the date on which there was actual proof of such loss of hearing based upon a medical examination, and the carrier of the risk at that time has been ruled to be liable for all of the pathological damage accruing up to that point.

This creates a situation in which a carrier insuring an industry with a high noise level, but in which no claims have been filed and in which no audiometric examinations have been made of the workers which would determine the date of their disablement, might simply cancel the risk in an effort to escape all liability completely. This occurred in New York when the silicosis situation arose, and was at least partly responsible for a substantial diversion of business in the late thirties from the private carriers to the State Insurance Fund which under the New York system competes with the private carriers and is required to insure all risks which cannot be insured elsewhere.[63]

The New York system also permits what is called self-insurance and of course where this is true some of these questions would not exist. I have no intention here of discussing the broad question as to the relative merits of the different methods of insuring Workmen's Compensation risks,[64] but I do suggest that this complication is an added reason for the desirability of finding a fair solution to the whole problem of industrial noise as promptly as possible.

Questions Still Unsolved in New York

THERE are a number of medicolegal questions still unsolved in New York which I want to mention.

1. The New York act creates what is known as a Special Fund for Reopened Cases to which all employers and carriers in the state contribute through assessments made against them in certain specified types of cases.[65] The general purpose of this fund is to take care of stale cases,[66] and the act specifically provides, among other things, that where an application for compensation is made "after a lapse of seven years from the date of injury .... and claim for compensation previously has been disallowed or claim has been otherwise disposed of without an award of compensation," then the award shall be made against this special fund.

The question as applied to these loss of hearing claims is this. Under the current rulings the cases are, in the language of the statute, being "disposed of without an award of compensation." Can it, therefore, be contended that if an application to reopen is not filed until after a lapse of seven years then the award would have to be made against this special fund? This is an important question, for if the Board should rule that under

60. Associated Industries of New York State, after extended consideration of the problem of occupational deafness believe that the New York law should be amended (1) to eliminate schedule awards entirely and to substitute awards based on actual loss of earnings, and, (2) to make applicable to occupational loss of hearing cases the provision now contained in the act with respect to silicosis cases, namely that "compensation shall not be payable for partial disability."

61. N.Y. Workmen's Compensation Law, Sec. 44.

62. *Strauss v. Waldenberg*, 240 App. Div. 795.

63. In New York State any employer can procure a policy in the State Fund so there is no necessity for an Assigned Risk Plan such as exists in many other states.

64. Some spokesmen for labor advocate the elimination of private insurance companies entirely and insuring the risks by exclusive or monopolistic state funds to eliminate commissions and brokerage fees and the "profit" which it is claimed is made by the commercial companies (*Cf.* POLLACK, supra, note 7). As to the question of profit, the member carriers of the National Council on Compensation Insurance sustained an underwriting loss of $25,697,315 in New York State in 1950 (Tables quoted in HORNE articles in the *New York Times*, supra, note 35), and REEDE has stated that "Most of the fears expressed, that if employers were permitted to insure their compensation liability with private carriers a profit would be made out of an insurance line social in character, have proved to have little basis" (REEDE, supra, note 59, p. 310). The question of whether the insurance should be limited to an enforced state monopoly or whether it should be left on a competitive basis with a competitive State Fund was considered when the New York Compensation Law was first enacted in 1914. The question was further studied by an Industrial Survey Commission created by the New York Legislature in 1926 which recommended preserving the competitive system. Among other things this Commission stated "Were the State Fund the sole insurance carrier in the field it is probable that in the end the expense of insurance, taken as a whole, would be increased. A State Fund would not as vigorously fight the fraud and the malingerer. Possibly there might be a shadow of politics." (New York Legislative Document, 1927, No. 69, pp. 24-28). REEDE, supra, states that "standards are as high in New York, with a competitive state fund, as in Oregon with an exclusive state fund" (p. 238). He stresses the fact that in considering this problem "one must compare not only expense ratios but the services they represent" (p. 304).

65. N.Y. Workmen's Compensation Law, Sec. 25-a.

66. *Cf. Casey v. Hinkle Iron Works*, 299 N.Y. 382 (1949). This enactment is also intended to cushion the burden of the employer and carrier by relieving them from a continuing liability (*Watkins v. Cornwall Press*, 270 App. Div. 615, 1946).

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these circumstances the liability becomes that of the special fund, this would have the effect of transferring a substantial portion of the cost of industrial deafness in New York State from the industries which have a high noise level to industry as a whole.[67] I shall not discuss the question of whether this would be desirable, nor shall I venture an opinion as to whether these provisions of the statute would be applicable. Since as a practical matter the question will not arise until the seven-year period has gone by in these cases, we will all have ample time to think about the matter.

2. The second question is a medical one which I would like to pose to my good friends in the medical profession. In a number of these cases in New York the attending otologists are giving rather extensive treatments to the claimants in the form of vitamin therapy which, under New York's system permitting a free choice of doctors by the injured worker,[68] is a medical expense which industry has to assume, providing the treatments are justified. One of these otologists has testified that he is not giving these treatments because of any nutritional deficiency or for the hearing loss at all, but solely for the individual's tinnitus and headaches. He also stated that "I don't know of anything better than vitamin B to regenerate nerve fatigue."[69] I would like to suggest, therefore, that one of the things which organized medicine can do is advise industry concerning these alleged therapeutic procedures and whether they constitute a justifiable medical expense which industry should be compelled to bear in cases of occupational deafness.[70]

3. The final and most important question still unsolved in New York is the question revolving around the proper method of determining the percentage loss of hearing, that is whether the percentage loss should be computed under the tentative A.M.A. method, under the so-called Point 8 method, or in some other way.

The New York Board has not yet made any ruling on this question, owing to the fact that awards in most of the cases are being deferred for the reasons previously stated, and to the fact that in other cases where the question of permanency was not at issue the parties agreed on a compromise percentage. While I do not want to repeat anything the previous speakers may have said, I should like to make a few comments on this most important question.

The first is that there seem to be several variations of the Point 8 method. In the last series of hearings in which I participated in Buffalo, involving eight claims, the claimants' otologists testified that while he used the Point 8 method he did not use the three frequencies of 512, 1024 and 2048 as originally advocated by Dr. Fletcher,[71] but used the six frequencies of 256, 512, 1024, 2048, 2896 and 4096.

Since the carrier's otologist, Dr. Jerome Glauber, had used and testified in support of the original Fletcher method, I asked him to prepare a comparative table, using his own audiograms, of the percentages under the AMA method and the two Point 8 methods which he was good enough to do. This table is as follows:

TABLE I.

Case No.	Tentative AMA Method		Point 8 Method Using Frequencies of 512, 1024 and 2048		Point 8 Method Using Frequencies of 256, 512, 1024, 2048, 2896 & 4096	
	Right Ear	Left Ear	Right Ear	Left Ear	Right Ear	Left Ear
1	40.0	40.0	29.3	26.6	30.6	30.0
2	5.0	4.0	13.2	10.6	13.4	12.0
3	33.0	50.5	21.4	29.4	26.6	34.6
4	33.0	25.0	28.0	26.6	28.6	27.4
5	100.0	84.0	74.6	54.6	73.4	59.4
6	27.0	27.0	22.6	21.36	25.3	26.0
7	11.0	38.5	17.4	34.6	19.4	34.6
8	50.2	53.3	30.6	30.6	35.4	36.6
Total	299.2	322.3	237.10	234.36	252.7	260.6
Average	37.4	40.3	29.6	29.3	31.6	32.6

67. A portion of the cost might also be transferred to industry as a whole under New York's Second Injury Law which creates another fund to assume part of the liability in those cases where a man is employed, or continued in employment, with an impairment which is deemed a hindrance or obstacle to his work, and who thereafter acquires a new or added disability because of such employment (Sec. 15, Subd. 8, and see "Employers' Compensation Liability for Physically Handicapped Workers—Clarifying the Operation and Meaning of New York's Second Injury Law," SYMONS, N. S. *The Monitor*, Associated Industries of New York, 38:3 (August) 1951).

68. In New York State the injured employee can "select to treat him any physician authorized by the chairman to render medical care...." (Sec. 13-a).

69. *John White et al v. General Drop Forge Co.*, S.M. 1/5/52.

70. In "Medical Aspects of Hearing Loss" (Chap. 4, "Hearing and Deafness—A Guide for Laymen," edited by DAVIS, H., Rinehart Books, Inc., 1951), FOWLER, E. P., JR., comments on the fact that "the relief of tinnitus by any direct treatment is of ....rare occurrence" (p. 91), and in the same volume in "The Surgical Treatment of Hearing Loss" (Chap. 5), WALSH, J. E., observes that "tinnitus is a most distressing symptom, for which, unfortunately, we have no specific treatment" (p. 106). In "Chronic Progressive Deafness, Including Otosclerosis and Diseases of the Inner Ear" (*Arch. Otolaryng.*, 33:436 (March) 1941) SHAMBAUGH, G. E., JR., pointed out that one of the strongest arguments against the theory that vitamins are important in nerve deafness is the fact that deafness is not a symptom of clinical avitaminosis. In "Otological Research and Its Recent Contributions to Clinical Otology" (*Am. Otol., Rhin. & Laryng.*, 50:77 (March) 1941), HUGHSON, W., and THOMPSON, E., stated that "From an anatomic standpoint alone, neural impairment of hearing is final and, in its manifest and individual degree, complete. Why should vitamin B or any of its various complexes restore function to an organ of Corti deprived of its neural mechanism?" However, in "Is Hearing Loss Due to Nutritional Deficiency" (*Arch. Otolaryng.*, 53:515 (May) 1951), LOBEL, M. J., stated that "Results of clinical trials with a new injectable vitamin A preparation hold out promise of its therapeutic value in certain types of deafness. Despite the fact that in some instances the hearing loss was not influenced, the accompanying tinnitus was greatly relieved" (p. 526). See also MELLANBY, E.: "The Experimental Production of Deafness in Young Animals by Diet" (*J. Physiol.*, 94:380 (December) 1938); KOPETZKY, S. J.: "Present Status of Medical and Surgical Therapy for the Deafened" (*Laryngoscope*, 54:217 (May) 1944); GUGGENHEIM, L.: "Therapy of Deafness" (*Laryngoscope*, 53:653 (October) 1943); COVELL, W. P.: "Pathologic Changes in the Peripheral Auditory Mechanism Due to Avitaminoses (A, B Cmplex, C, D and E)" (*Laryngoscope*, 50:632 (July) 1940); JONES, I. H.: "Vitamins and the Ear, Nose and Throat" (*Laryngoscope*, 50:585 (July) 1940); CHILDREY, J. H.: "Vitamin B and Other Measures in the Treatment of Deafness" (*Laryngoscope*, 50:648 (July) 1940); JOHANSEN, H.: "Treatment of Hardness of Hearing and Tinnitus with Vitamin B" (*Acta Oto-laryng.*, 34:176, 1946). It is the author's conviction that industry should only be asked to pay for medical and surgical procedures which are fully and widely recognized, and not for procedures which are still in an experimental or investigative stage.

71. Some of the references as to the origin of the Point 8 method will be found in Note 60 in "A Lawyer Looks," etc., supra, note 37.

It will be noted from these figures, *first*, that in a few isolated instances the two Point 8 methods produce a higher percentage than the AMA method; and, *secondly*, that Point 8 method using the six frequencies produces only slightly higher average percentages than the original Fletcher method.

Of course, this is too small a sample to be conclusive, and Dr. Glauber has also informed me that these eight cases include other complicating factors such as obstructive deafness due to infection in one case, a suspicious malingerer in another case, and a very suspicious otosclerosis in another case. In other words, these are not all pure industrial losses but include some concurrent defects of an entirely different nature.

Dr. Joseph C. Scanio, of Buffalo, has also been good enough to prepare a chart covering another series of 16 cases which is included as Table II. This gives the figures for three successive audiometric examinations computed under the AMA method, under the original Fletcher method using the frequencies of 500, 1000 and 2000 and, lastly, using the Point 8 method with the five frequencies of 250, 500, 1000, 2000, and 4000.

For the 96 tests of both ears in the successive examinations in the 16 cases the average loss under the AMA method is 49.5%, whereas, under the two Point 8 methods it is identically the same, namely 33.1%, which would indicate that adding the lower frequency of 250 and the higher frequency of 4000 to the original Fletcher method does not substantially change the overall results. Some of Dr. Scanio's other conclusions to be drawn from the data on this chart are set forth in one of the notes.[72]

A few final comments on this question. The AMA method, was, of course, characterized by those who formulated it as a "tentative" method.[73] Because of this, because it is a binaural rather than monaural method, because it makes no allowance for presbycusis and the other non-industrial causes of deafness which may be present in many cases, and because of the general confusion now existing with respect to these various percentage methods, I express the hope that those who are now working on this problem within the ranks of organized medicine will give us the right solution at the earliest possible moment, as I know they themselves want to.

The answers cannot be found overnight, but we may be equally sure that out of the experience which is developing in the field throughout the country, and as a result of the untiring efforts of the many fine men who are studying the matter, we will develop a solution fair to everybody. I am also confident that this solution will not, with salutations to Dr. Stacy Guild, overlook the inverse-square law of the diminution of sound,[74] that it will recognize the patient's ability to engage in normal conversation as well as the effect of his hearing loss on his economic, personal and social life, that it will be a method which will make it possible to eliminate simulation, exaggeration and audiometric readings based on "larceny of the heart,"[75] and, most important, that it will be a simple solution which we poor laymen who have to cope with the problem will be able to understand without too much mental effort.

Developments in Other States

OWING to the growing number of claims for occupational deafness throughout the country, the legal phases of the problem have been given more and more consideration in recent years.[76] Some of the current developments in two other states, Wisconsin and New Jersey, are of particular interest.

WISCONSIN: Up to January 16, 1952, according to information which Harry A. Nelson, Director of Workmen's Compensation of the Industrial Commission of the State of Wisconsin, was good enough to furnish me, approximately 30 claims for occupational deafness have been filed in that state, but from information which has come to me through several sources it appears probable that a large number of additional claims will be filed in the near future, most of them, as I understand it, by men who are working right along and earning their full wages.

One of the questions which has been raised in the defense of these claims in Wisconsin is that some allowance or deduction should be made for the age factor in computing the hearing losses, and testimony has also been taken in that state as to difference between the Point 8 method and the AMA method.

In one case the Examiner ruled that no deduction should be made in the calculation of the percentage loss on account of the age of the applicant,[77] and this question is now pending before the Wisconsin Commission, as is also the question of the proper method of determining the percentage loss.

A brief filed by Kenneth Grubb, of Milwaukee, in one of the pending cases, in which he urges that a deduction should be made for the age

72. DR. SCANIO has pointed out to the author that this diagram would indicate, among other things, that poor conversational ability goes with advancing age and not with the length of time of the employment, as shown by the fact that extreme employment time is present only in Cases 13 and 16, whereas the younger group whose conversational ability is better have worked for longer periods of time than, or at least as long as, some of the older men. Secondly, in the younger age group, even in spite of tinnitus, the audiograms show marked hearing loss but the ability to hear conversation is good. In the older group tinnitus and poor conversational ability are more consistent with the audiometric findings. Lastly, the two variations of the Point 8 method are reasonably close regardless of age. The results are definitely out of line with the AMA method but are more consistent with the patient's ability to carry on normal conversation.

73. "Tenative Standard Procedure for Evaluating the Percentage Loss of Hearing in Medicolegal Cases." *J.A.M.A.*, 133:396 (February) 1947.

74. This inverse-square law of the diminution of sound and its relation to the problem of determining percentage loss of hearing is discussed at considerable length by the author in Note 63, "A Lawyer Looks, etc.," supra, note 37.

75. BRAIMAN: supra, note 46.

76. See "The Legal Aspects," supra, note 13.

77. *Aldrich v. Green Bay Drop Forge Co.*

TABLE II. A TABULATION OF HEARING LOSSES IN 16 CASES

Case Number	1		2		3		4		5		6		7
Age	33		37		38		38		40		41		42
Years at work	15		14		14		12		15		10		7
Tinnitus	Bilateral 15 years		None		Off and on		R.O.M.P. 12 years ago. Perf. R.E. off and on whistle in R.E.		Off and on		Constant		Slight
Conversational Ability	Excellent		Excellent		Excellent		Excellent		Fair to Poor		Good		Excellent
AMA Method	R	L	R	L	R	L	R	L	R	L	R	L	R	L
First examination	49	34	37	22	52	56	33	19	40	66	51	29	56	14
Second examination	37	48	36	17	52	56	45	16	48	49	48	20	48	12
Third examination	32	32	32	22	53	55	33	19	61	56	44	14	50	9
Average	39.3	38.0	35.0	20.3	52.3	55.7	37.0	18.0	49.7	57.0	47.7	21.0	51.3	11.7
Point 8 Method (500-2000 frequencies)														
First examination	29	25	18	17	32	34	38	17	24	41	33	24	54	17
Second examination	25	34	20	17	33	33	33	17	13	36	38	17	36	14
Third examination	28	21	22	17	33	34	33	20	41	40	26	16	39	13
Average	27.3	26.7	20.0	17.0	32.7	33.7	34.7	18.0	26.0	39.0	32.3	19.0	43.0	14.7
Point 8 Method (250-4000 frequencies)														
First examination	28	25	21	18	32	32	30	22	28	39	32	24	40	17
Second examination	25	29	22	17			30	22	13	32	29	20	32	18
Third examination	28	24	23	18	32	33	35	28	40	35	29	17	37	16
Average	27.0	26.0	22.0	17.7	32.0	32.5	31.7	24.0	27.0	35.3	30.0	20.3	36.3	17.0
Average loss based on three methods of computation	31.2	30.2	25.7	18.3	39.9	41.7	34.4	20.0	34.2	43.8	36.6	20.1	43.5	14.4

factor for the reason that the AMA chart is based upon the hearing of a person 18 years of age, refers to a number of studies which have been made in this country and in Finland on the subject of presbycusis, and Grubb has taken some of these studies and has recomputed the findings under the AMA Audiogram and Hearing Loss Chart.

Many of you are familiar with the first study made by Bunch in 1929, who examined 353 persons from the ages of 22 to 70 and made composite audiograms showing three curves representing the means and the mean variations at the various decades of life.[78] These were all patients who, insofar as the patient himself knew, had normal hearing, and where there was no history of previous middle ear disease or other conditions which would influence the hearing, and the tests were all carried out under uniform conditions and on the same instrument.

Grubb's table showing the decibel losses of the different tones at the various levels, with the percentage figures as computed under the AMA chart, is as follows:

C. C. BUNCH 353 Cases February 14, 1929									
No.	Age	128	256	512	1024	2048	4096	8192	Per Cent
68	20-30	15	18	20	14	14	12	8	3.1
70	30-40	15	20	20	14	14	18	11	3.8
78	40-50	16	21	18	17	20	24	19	6.7
85	50-60	17	22	23	19	27	33	35	12.7
52	60	20	23	28	25	37	46	50	23.6

78. BUNCH, C. C.: "Age Variations in Auditory Acuity." *Arch. Otolaryng.*, 9:625 (June) 1929.

In 1930 Bunch and Raiford made a further study of 693 cases,[79] and this showed somewhat lower percentages as computed under the AMA chart. However, these two series of 1046 patients gave, according to Grubb's brief, approximately the following average figures:

Age	Loss
20-30	2.3%
30-40	3.2%
40-50	5.4%
50-60	10.5%
60	17.2%

Grubb made the same computations with respect to the findings of some of the Finnish investigators,[80] and of the survey made by the Bell Telephone Company at the World's Fair in 1939.[81] He also refers to various other writers on the subject of presbycusis,[82] and comments

79. BUNCH, C. C., and RAIFORD, T. S.: "Race and Sex Variations in Auditory Acuity." *Arch. Otolaryng.*, 13:423 (March) 1931.

80. LEISTI, T. J.: "Audiometric Studies of Presbyacusis." *Acta oto-laryng.*, 37:555, 1949; JOHANNSEN, H.: "Undersogelser Over Den Aldersbetingde Tunghorod." Kobenhavn, 1943.

81. STEINBERG, J. C., MONGOMERY, H. C., and GARDNER, M. B.: "Results of World's Fair Hearing Tests." *Bell Teleph. Syst. Tech. J.*, 19:533, 1940; abridged form in *J. Acoust. Soc. Amer.*, 12:291, 1940.

82. KELLEY, N. H.: "A Study in Presbycusis: Auditory Loss with Increasing Age and Its Effect on the Perception of Music and Speech." *Arch. Otolaryng.*, 29:506 (March) 1939; FOWLER, E. P., and FOWLER, E. P. JR.: "Normal Hearing by Bone Conduction as Measured with an Audiometer." *Ann. Otol., Rhin. & Laryng.*, 45:754 (September) 1936; LEWY, A., and LESHIN, N.: "Functional Examination of Hearing." *Arch. Otolaryng.*, 31:344 (February) 1940; NUSSDORFER, R.: "Audiogram of Senile Deafness," *Atti clin. otol. Torino*, 1938, p. 43; CIOCCO, A.: "Observations on the Hearing of 1,980 Individuals: A Biometric Study." *Laryngoscope*, 42:837 (November) 1932.

COMPUTED UNDER THREE METHODS OF CALCULATION

8	9	10	11	12	13	14	15	16	
46	47	48	51	54	58	58	58	61	
16	9	11	12	11	33	17	16	37	
Constant	R.E. only	None. Old Perf. L.E.	Constant	Constant	None	L.E. injury 14 years ago with tinnitus and poor hearing since	Off and on bilaterally	Traumatic rupture R.E. 1916 with hearing loss since	Average of all losses as computed under the three methods
Good	Good to Excellent	Excellent in R.E. Poor in L.E.	Excellent	Fair to Poor	Very Poor	Poor	Poor	Poor	
R L	R L	R L	R L	R L	R L	R L	R L	R L	
42 40	60 51	7 65	46 49	57 61	64 73	64 71	77 94	77 67	52.0
40 40	60 47	7 42	48 50	58 58	62 71	72 64	76 83	67 77	48.5
51 50	59 44	9 58	47 54	44 54	64 70	67 70	84 91	77 70	49.5
44.3 43.3	59.7 47.3	7.7 55.0	47.0 51.0	53.0 57.7	63.3 71.3	67.7 68.3	79.0 89.3	73.7 71.3	49.5
29 26	40 36	8 40	30 30	37 40	40 45	38 44	50 58	48 41	33.8
21 21	40 34	10 32	32 33	40 41	38 42	44 40	50 53	41 48	32.1
33 33	40 33	12 38	33 30	33 34	41 42	44 42	54 58	48 38	33.4
27.7 26.7	40.0 34.3	10.0 36.7	31.7 31.0	36.7 38.3	39.7 43.0	42.0 42.0	51.3 56.3	45.7 42.3	33.1
27 25	41 32	13 43	28 30	35 37	36 43	48 44	48 62	50 42	33.5
24 24	39 32	14 37	31 32	38 44	37 41	43 42	46 56	42 48	32.0
32 31	40 31	16 40	29 34	32 34	37 40	42 44	52 60	49 44	33.8
27.7 26.7	40.0 31.7	14.3 40.0	29.3 32.0	35.0 38.3	36.7 41.3	44.3 43.3	48.7 59.3	47.0 44.7	33.1
33.2 32.2	46.5 37.8	10.7 43.9	36.0 38.0	41.5 57.5	46.5 51.9	51.3 51.2	59.7 68.3	55.4 52.8	

on the different circumstances under which the various tests were made, whether the examining room was sound-proofed, whether the tests were taken under controlled conditions, whether there was any impairment by the masking effect of extraneous sounds, and other matters of a similar nature.

He urges that the conclusion to be drawn from all of these authorities is that hearing acuity diminishes with age, and that some deduction should be made for this factor in computing the percentage loss of hearing.

Grubb refers to the suggestion made by one of the physicians in Wisconsin that a fair allowance for the age factor would be to deduct from the audiometric reading 10 db for each 10 years after the age of 30 at the 2,000 and 4,000 frequencies. For example, if the audiogram of a patient 40 years old showed a hearing of 50 db at the 2,000 level, this would be raised to 40 db, and if at the 4,000 level it showed a reading of 60 db, this would be raised to 50 db, and the loss would then be computed by using the AMA scale in the usual way, but using the corrected readings instead of those shown by the audiogram.

Just how the Wisconsin Commission will ultimately resolve this question, as well as the question as to the proper percentage method of determining the hearing loss, remains to be seen.

It is also being asserted in Wisconsin that because of rating and reserve complications, and for other reasons, any awards made should be final rather than interlocutory,[83] and also that the claims should not be allowed because there has been no date of accident determined under the Wisconsin law which defines the date of accident in cases of disease as "the last day of work for the last employer whose employment caused disability."[84]

It will thus be seen that Wisconsin, as well as New York, is having its industrial noise problem, and that many of the questions raised in the two states are similar. I would think that the way these two states meet the problem may have considerable influence upon its solution in other jurisdictions.

NEW JERSEY: Recent press releases carried a story of a large number of common law suits filed by employees against a large ship building company in New Jersey asking several millions of dollars in damages for alleged loss of hearing, and a brief word as to the situation in that state might be of interest.

Prior to January 1, 1950, the New Jersey Occupational Disease Law was of the schedule type and did not include loss of hearing. Under that law the New Jersey courts had held that an action at common law could be maintained for an occupational disease not enumerated in the Act.[85]

Effective on January 1, 1950, New Jersey enacted an all-inclusive Occupational Disease Law

83. Wisconsin statute, Sec. 102.03 (3).
84. Wisconsin statute, Sec. 102.01 (2).
85. *Downing v. Oxweld Acetylene Co.*, 112 N.J.L. 25, 169 A. 739, aff'd. 113 N.J.L. 399, 174 A. 900, 1934; also 100 A.L.R. 519.

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under which the common law actions mentioned above can no longer be maintained.

The complaints in the loss of hearing cases which have been instituted all allege damage prior to January 1, 1950, the effective date of the new law. They assert various grounds of negligence, as for example, failure to provide proper noise silencers, failure to furnish a safe place to work, failure to give adequate warning about the dangerous character of the noise, etc.

The defendant has raised, *inter alia*, the defenses of no negligence, contributory negligence, assumption of risk, statute of limitations, etc. And, in addition, in those cases in which the proof might show that the majority of the exposure, if any, was on shipboard, the defendant has asserted that the liability, if any, is solely under the Longshoremen's and Harbor Workers' Compensation Law.

It occurs to me as a lawyer that one of the interesting questions that might be involved or raised in these cases is whether the alleged wrong is a single and continuous one and, therefore, whether, where the employee has been continually employed before and after January 1, 1950, he would be limited to recovery under the new Occupational Disease Law.[86]

Just how these questions will ultimately be resolved I do not know, but I have mentioned this New Jersey situation as it might arise in other jurisdictions.

Conclusion

THE solution of the whole problem of industrial noise will require the best efforts of the scientists and acoustical experts, the medical profession, industry, labor, the insurance companies, the legal profession, and, of course, the legislatures, courts and Workmen's Compensation Boards of the various states. There must be a cooperative integration of effort, and as far as the legal approach is concerned, we must always remember that our legal system is in constant need of reappraisal, to overcome the errors due to human fallibility as well as to meet the ever-shifting needs of our complex society.

The scientists must continue their efforts to learn more about sound and its behavior, the measurement of sound, ultrasonics, mechanical vibration, the elimination and control of sound,[87] etc., and one of their goals should be to make this information available to the laymen in its most understandable form. Theoretical knowledge, to be used on the firing line in the legal world of reality, must be reduced to terms of the utmost simplicity.

Organized medicine should continue its splendid efforts to formulate more definite postulates as to the etiology of occupational deafness, to develop data as the effect of noise at various intensities and frequencies, to develop medical control programs for noisy environments, and to determine the relative efficiency of available ear protectors and standard procedures for testing ear protectors.

Industry and labor must work together in encouraging research projects, in sponsoring surveys of industrial plants, in developing further experimental data as to noise hazards, in taking the necessary steps to eliminate and/or control all unnecessary noise, and in encouraging the distribution and use of the most effective ear defenders. And in the more controversial field involving the filing and defense of claims, industry and labor must, at all costs, avoid invective and distrust, which serve only to weaken the fibers of our democratic society. They must both recognize the interest of the public whose attitude, I am sure, is that while everything possible should be done to raise our industrial health standards, nevertheless, the cost should at all times be kept within reasonable bounds, particularly in those cases where the worker's loss of hearing does not interfere with his job performance. While our workmen's compensation system is one of expansion rather than of contraction, the expansion should be predicated on temperance, moderation, and justice.

We must all recognize that occupational deafness as a compensable disease is an entirely new medicolegal concept which requires an intimate understanding of the fact that many of yesterday's ideas are apt to become obsolete tomorrow. The problem is one which should be considered from the humanitarian, social, medical and economic aspects,[88] and if we do this I am sure we can find a solution which will be fair to all segments of our economy, which will show no favoritism, and which will be fully in accord with our traditional American concepts of fair play. This is an age of rapidity, so let us hope that with our combined and concentrated efforts all of the answers to the problems involving the acoustical spectrum will soon be found.

(440 M. & T. Building.)

86. Generally see *Mnich v. American Radiator Co.*, 263 App. Div. 573, aff'd. 289 N.Y. 681; and *Moffett v. Harbison-Walker Refractories Co.*, 14 A. 2d 111 (Pa).

87. Many of these problems are outlined by WALWORTH, H. T., in "The Noise Problem in Industry," paper presented before the Tennessee Section, American Industrial Hygiene Association, Nashville, November 30, 1951.

88. *Cf.* FOX, M. S.: "Acoustic Trauma." *Wisconsin M. J.*, 50:563 (June) 1951.

First Aid Guide for the Small Plant
— The Detroit Plan Manual —

THE DETROIT PLAN for First Aid and Emergency Medical Services in Small Plants (*Industrial Medicine and Surgery*, 19:7, 326 (July) 1950) provides that every work place should have:

1. A definite plan of procedure in case of serious accident or acute illness among employees.
2. An adequate first-aid kit, properly located.
3. Personnel properly trained to use the kit.

The training of personnel in proper first aid methods presents a problem. Existing courses (and manuals) which are generally available to individuals or small groups are usually presented from the standpoint of outdoor or home accidents. The Detroit Industrial First Aid Advisory Committee has felt it desirable to design a course and guide particularly suitable for meeting the problems as they actually occur in small industrial establishments, and for which a convenient teaching schedule can be arranged. The guide is reproduced here in the belief that it will be useful in many other industrial regions of the country. In actual teaching practice, it should be supplemented by the American Red Cross Textbook or similar reference texts.

In Detroit, the course is taught by the Adult Education Department of the Detroit Public Schools. It consists of four class meetings, each of three hours' duration, held over a period of two weeks. Since both afternoon and evening classes are available, employers may send employees to class during one-half of a regular working shift. The student is given a wallet-size certificate upon successful completion of the course.

The first aid training is not intended to replace the more complete first aid courses taught by the American Red Cross. American Red Cross courses should be available to all who wish to obtain the American Red Cross certificate in first aid.

Introduction

THIS is your guide for first aid procedures in a small workplace. It will assist you in following first aid instructions while attending an industrial first aid course and should be kept for reference.

This outline is based on the American Red Cross "First Aid Instructor's Manual" with changes made where a different first aid procedure is indicated for industry. Some procedures have been added and some have been deleted in order to make this guide best suit its purpose. It has been prepared by the Detroit Industrial First Aid Advisory Committee. The members of this committee are:

ALFRED H. WHITTAKER, M.D., F.A.C.S., Past-President, Industrial Medical Association, Chairman.

WILLIAM G. FREDRICK, SC.D., Director, Bureau of Industrial Hygiene, Detroit Department of Health.

E. A. IRVIN, M.D., Medical Director, Cadillac Motor Division, General Motors Corporation.

ESTHER W. KILMER, R.N., B.S., Industrial Nursing Consultant, Bureau of Industrial Hygiene, Detroit Department of Health.

J. M. LYNCH, M.D., Division of Industrial Health, Michigan Department of Health (present address: U.S. Public Health Service, Washington, D.C.).

JOEL P. WOLF, Deputy Commissioner, Michigan Department of Labor.

PAUL T. SALCHOW, M.D., Detroit Department of Health.

SAMUEL W. WICKHAM, Chief Inspector, Michigan Department of Labor.

JOSEPH L. ZEMENS, M.D., Medical Director, Packard Motor Car Company.

Drawings in this guide were prepared through the courtesy of the Institute of Industrial Health, University of Michigan.

Medical Care

YOUR plant physician should be consulted to determine his recommendations for specific first aid procedures. These recommendations should include types of medication to be used for minor injuries. Frequently the plant physician will recommend different medications for injuries requiring his medical attention. These recommendations should be followed carefully. Failure to follow them may result in interference with the type of treatment your physician wishes to provide.

If management wishes to include temporary relief for non-occupational ailments, such as colds, headaches, etc., your plant physician should also be consulted for these procedures.

Certain information should be posted in your plant either by the first aid kit or near a telephone:

1. Name and telephone number of the ambulance to be called.
2. Name and telephone number of the hospital where emergencies are sent.
3. Name, phone number and address of your industrial physician.
4. Name of person in the plant to whom injuries are to be reported. This should be listed for each shift.

This plan should be worked out for each work place so that there will be no delay at the time of an emergency. (Fig. 1).

First Aid Kits

EVERY plant or establishment, no matter how small, should have certain first aid supplies available for the care of injuries. The kit should not be locked and should be conveniently located. First aid equipment must be kept in a dust-tight, durable case

In Case of Accident

CALL IMMEDIATELY:

AMBULANCE:	Phone No. _____ Name _____
HOSPITAL:	Phone No. _____ Name _____
PHYSICIAN ON CALL:	Phone No. (Office) _____ (Home) _____ Name _____ Address _____
REPORT ALL INJURIES TO:	Day Shift _____ Afternoon Shift _____ Night Shift _____

For REAL HELP in YOUR Accident Prevention Program call the Detroit Industrial Safety Council, TRinity 2-0300

REVISED TWO YEARS FROM THIS DATE _____

Fig. 1.

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and near hand washing facilities. It should be the duty of someone in the plant to see that adequate first aid supplies are always on hand and that the kit and supplies are kept clean. The most important items and those considered to be "musts" are the items starred:

*1. 3" x 3" gauze pads (individually wrapped) (6-12). These gauze squares may be used to apply pressure or to bandage a small wound. Also they may be used to apply medication to a wound when sterile applicators are not available. These are to be removed from the wrapping by tearing one corner, pulling the gauze out by that corner and applying to the wound without touching the part going next to the wound.

*2. Large sterile gauze 1 yard square or pressure dressings at least 6" x 6" (2). This gauze is to be used to cover a large wound or burn, while taking the patient to the doctor. Few of these severe accidents will occur, but this gauze should always be on hand so that it will not be necessary to use a dirty cloth or towel over the wound, resulting in an infection. This gauze should be individually wrapped and left unopened so that it will remain clean and sterile when needed. Even if a plant has never had a severe accident, this gauze should be available the same as a fire extinguisher should be available even if the plant has not had a fire.

*3. Ready-made adhesive gauze compresses. These are for minor cuts and burns. These should be applied without touching the gauze that will come in contact with the wound.

*4. One-inch and two-inch gauze bandage rolls. These are for the purpose of bandaging the sterile gauze in place over the wound. They are not intended to be used directly over the wound.

*5. Triangular bandage.

*6. Burn preparation. Your plant physician may wish that you use one procedure for small burned areas and another for large burns. Burn ointments for first aid kits are better in tubes, than jars. They may be applied with the 3" x 3" sterile gauze.

*7. Wound antiseptic. The type of antiseptic should be recommended by the plant physician and not by individuals in the plant.

If iodine is used, it should be obtained in small vials designed for one application only. If iodine solution in bottles is kept too long, it will become much stronger and burn the skin of some people. Precautions should, also, be taken in applying fresh iodine. If applied to moist skin surfaces or if covered by bandage before dry, there is danger of burns. Individual vials or swabs may be obtained for other antiseptics and are much to be preferred for the use in a first aid kit.

8. A small ledger or notebook in the first aid kit is convenient for recording any treatment given. The purposes of these recordings are: (a) to show nature of injuries or other ailments occurring in the plant; (b) for the worker to have a record of his injury in writing; and (c) for the protection of the first aid worker and management regarding treatment given. Have the ledger or notebook ruled off as follows: *Date——— Name of Worker——— Complaint——— First Aid Rendered By Whom———*

9. An eye cup should not be placed in the first aid kit. In small plants, there are poor facilities for boiling eye cups; and even if they are boiled, dirt from the eye lids could be washed into the eye. Many serious eye infections have resulted from the use of eye cups. If the plant physician wishes eyes irrigated, it may be done safely only by using sterile equipment. Eye droppers and small containers may be boiled for this purpose. The irrigation solution (recommended by the plant physician) should be poured into these small containers and applied with the eye dropper. This procedure should be repeated for each eye irrigated. Any solution remaining in the small containers should be discarded.

If the plant physician wishes floating foreign bodies removed from the eye, it should be done with the use of a moist sterile applicator or by moistening a corner of the 3" x 3" sterile gauze. A worker with an embedded foreign body in the eye should be sent immediately to the doctor because the longer the foreign body remains in the eye, the greater the danger of infection or of penetration further into the eye. If oil or any ointment is applied to the eye, it should be done according to the recommendations of the plant physician. Castor oil or ointments for the eye should be ordered in individual tubes to be used for one application only.

10. Other items may be needed in the kit, depending on the hazards in the plant and the wishes of the plant physician. A cathartic should never be given out in industry and should not be in the kit. If aromatic spirits of ammonia is in the kit, it should be in ampules that may be broken when needed. All medications should be plainly marked, and labels should be read carefully before using. If medications for the eye are kept in the kit, they should be on a separate shelf if possible.

11. Applicators will be needed to use for removing floating foreign bodies from the eye if your plant physician so wishes. For this purpose, they should be sterile and individually wrapped. Applicators will not be needed in the kit to apply antiseptic if the antiseptic is ordered in the form of "swabs."

12. It is almost impossible to keep cotton clean in a first aid kit, so it is better not to order it. If sufficient sterile gauze is on hand, cotton will not be needed.

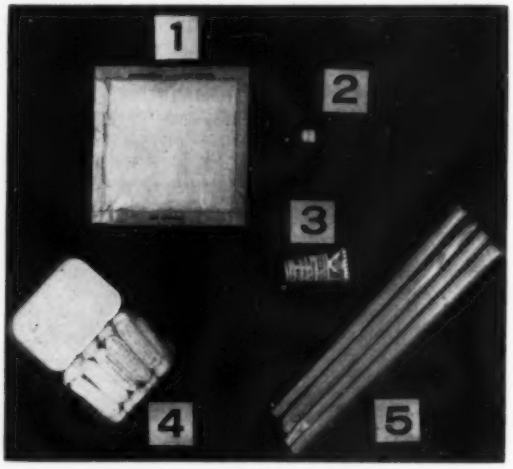

Fig. 2.
Individually-wrapped supplies for first aid kit: (1) 3" x 3" gauze pads; (2) Wound antiseptic, single application; (3) Eye ointment, single application; (4) Ampules of aromatic spirits of ammonia; (5) Individually wrapped applicators.

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General First Aid

I. PREVENTION:
Unsafe work practices or conditions lead to accidents; accidents, to injuries. The conservation of human life, the prevention of economic waste, and interferences with industrial production emphasize the need of instituting a planned accident-prevention program in every establishment. The first aid worker in the small plant should make this his responsibility.

II. DEFINITION OF FIRST AID:
First aid is the immediate and temporary care given the victim of an accident or sudden illness until the services of a physician can be obtained.

III. THE NEED FOR FIRST AID TRAINING:
A. Accidents and sudden illnesses are apt to occur any time in your plant.
B. Proper, immediate care is sometimes absolutely necessary to save life, and always is of help.
C. People often harm rather than help the injured, for, though they are well meaning, they are uninformed. Proper first aid education is necessary.

IV. GENERAL DIRECTIONS:
A. Position of the injured person:
Keep the injured worker lying in a comfortable position, his head level with his body, until you know whether the injury is serious.
B. Examination:
Look for serious bleeding, stoppage of breathing, and poisoning, in that order, first. They must be treated immediately. Then look for wounds, burns, fractures, and dislocations. Be sure you find all injuries. Feel the pulse. If the accident is violent, determine whether the victim is unconscious or semiconscious. If so, a head injury may be present.
C. Keep the injured person warm.
D. Send some one to call a physician or an ambulance. If the medical care information is properly posted, these telephone numbers will be easily available.
E. Keep calm and do not be hurried into moving the injured person unless it is absolutely necessary.
F. Never give water or other liquid to an unconscious person.
G. Keep onlookers away from the injured.
H. Make the patient comfortable and keep him cheerful.
I. Don't let the patient see his own injury.

V. THE ACCIDENT SCENE:
The first aider sometimes permits himself to give poor first aid care because conditions at the accident are bad.
A. The presence of crowds:
Other workers curiously watch, sometimes heckle, sometimes offer incorrect advice. They may demand haste in transportation or attempt other improper procedures.
B. Pressure from injured or co-workers.
The hysteria of co-workers of the injured, the evidence of pain, blood, and possible early death exert great pressure on the first aider to do something immediately. Thus he may fail to examine carefully, and may be persuaded to do what he would know in calm moments as to be wrong. The first aider can meet all these difficulties. Forewarned is forearmed. He should remember that few cases demand haste, a good examination is important and can be done slowly, and he has no other job so important and so gratifying as saving a life or a limb.

Shock

I. THE NATURE OF SHOCK:
A depressed state of all body functions caused by failure of the circulation. Severe shock is a serious condition and may result in death.

II. CAUSES:
Severe or extensive injuries, severe pain, loss of blood, severe burns, accidents due to electricity, seeing own injuries or injuries of others, fright, and heart attack. Shock may be more severe in the aged.

III. SYMPTOMS:
A. Pale skin.
B. Cool, clammy skin.
C. Feeling of weakness, faintness.
D. Perspiration. Can be noted at forehead above lips, palms of hands.
E. Weak pulse, sometimes rapid.
F. Nausea and vomiting.
G. Patient indifferent to events about him and to questioning.
H. Unconsciousness may occur.
The first three are the most common. Seldom are all present.

IV. PITFALLS:
A. Symptoms usually develop gradually; often shock symptoms are not noticeable at first.
B. A worker may seem to react well after a serious injury, and the first aider may be lax in shock care. Then the patient may collapse later.
C. Sometimes a patient will be in deep shock and yet give a few signs evident to the first aider.
D. With minor injuries or fears, people sometimes faint. This suggests that even with minor injuries, sometimes the patient should lie down.

V. FIRST AID:
Shock is so serious that every effort should be made to prevent it.
Prevention is best.
A. Position:
(1) Keep the patient lying down.
(2) Elevate the lower part of the body a foot or so if the injury is severe.
(3) In chest injury, raise the head and shoulders slightly if breathing is difficult, and keep the lower extremities flat.
B. Heat:
(1) Keep the patient comfortable, *but not hot.* Place blankets underneath him, but consider the temperature of the environment in covering him. Do not try to cause sweating. If tissue damage is great, do not try to make the extremities warm.
(2) In cold weather, added heat may be advisable by applying blankets, hot-water bottles, and so on. Heat improperly applied may burn the skin because the patient is not as sensitive to heat and cold, or it may warm the external parts too much.
C. Fluids:
Fluids may be given in small amounts unless the patient is nauseated, unconscious, likely to be operated on, or has an abdominal wound.

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Warm water, broth, milk, tea or coffee may be given.

D. Other measures:
Care for underlying injuries; avoid unnecessary disturbance.

Wounds

I. DEFINITION OF WOUND:
A wound is a break in the skin or in the coating or lining of any organ or tissue.

II. KINDS OF WOUNDS:
A. Abrasions—scraping or rubbing wounds.
B. Incised or cut.
C. Lacerated or torn, ragged.
D. Puncture wounds or stabs.

III. DANGERS FROM WOUNDS:
A. Shock. B. Hemorrhage. C. Infection.

IV. NATURE OF INFECTION:
Germs enter into the body at the wound and thrive. No matter how slight the wound nor how free from previous infection the patient has been, there is a definite danger in every wound.

V. FIRST AID:
When bleeding is not severe and injury is minor:
A. Do not touch the wound with the hands or unsterile material.
B. Consult the plant physician for advice concerning cleansing and treatment of minor wounds; apply antiseptic he has recommended and ready-made adhesive gauze bandage or sterile gauze and roller bandage as needed.

VI. WHEN BLEEDING IS SEVERE:
A. Stop the bleeding:
1. Direct pressure—This is usually all that is needed for control of bleeding and can be done by using the sterile gauze from your first aid kit.

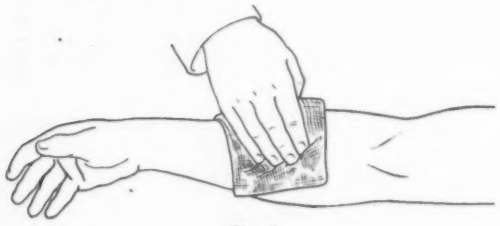

Fig. 3.
Gauze square being used over wound for control of bleeding.

2. Direct finger pressure into the wound (for large bleeding wound). Use the 3" x 3" sterile gauze to protect your fingers and press gently into the source of bleeding. Pressure along the wound edge usually does not control this bleeding. If necessary, the larger gauze may be used, but a large wad of gauze improperly applied will not control bleeding.
3. Digital pressure—
(a) Definition: Digital pressure for control of bleeding is applying pressure with the fingers to an artery where it passes over a bone, above the bleeding point.
(b) This method is needed only for severe arterial bleeding where there are large intermittent spurts of blood. This type of bleeding is rarely seen in industry. Even with amputated fingers, it is not seen because they result mostly from a crushing blow which, in itself, seals off the arteries. For this reason, the pressure points are not listed.
4. The tourniquet (seldom needed):
(a) Useful only for bleeding of the extremities.
(b) No matter where the extremity is bleeding, apply it high on the extremity—a hand's breadth from the top.
(c) USE ONLY AS A LAST RESORT when direct pressures do not control or when it is obvious that they will not control the bleeding.
The tourniquet is a dangerous instrument and is *used much too often*. But when it *must* be used, use it without hesitation.
(d) Use flat material at least 2" wide. Don't use rope, wire, or sash cord.
(e) Make it tight enough without cutting in. Otherwise, some blood will pass into the limb and cause grave swelling.
(f) Loosen every 15 minutes if continued use is necessary. If bleeding has ceased, do not tighten the tourniquet, but keep it in place.
(g) Try never to cover a tourniquet. If it is covered, always label clothing with a warning in writing so that others will release it intermittently.
5. Added helps:
(a) Keep the patient quiet; raise the extremity if it is the bleeding part; give no stimulants.

B. Apply a sterile dressing to the wound and send employee to a physician.

Special Wounds

I. PUNCTURE WOUNDS:
The important emphasis in puncture wounds is on the danger of tetanus. Even tiny wounds which do not bleed freely carry danger if the germ enters.
A. Characteristics of the wound:
1. Usually very little bleeding.
2. Difficult to clean out.
3. Air cannot get to the wound; therefore, special danger of tetanus (lockjaw).
B. First Aid:
The important care, which consists of thorough cleaning deep within the wound and administration of the tetanus antitoxin or toxoid, can be given only by a physician. The first aider, therefore, should apply a dressing and send the worker to a physician. Never wait to see what will happen, even until the next day.

II. INFECTED WOUNDS:
A. Definition:
Wound in which germs have already multiplied.
B. Prevention:
1. Immediate care of even the smallest wound.
2. Using only sterile dressings for all injuries.
3. Careful handwashing of the attendant administering first aid.
4. Most infections result from the saliva of the attendant, fellow employees, or injured worker, so use mask over nose and mouth or avoid talking if possible as long as wound

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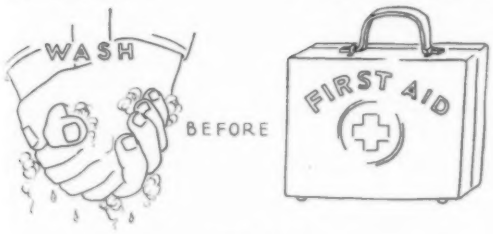

Fig. 4.
Wash hands before administering first aid.

is uncovered. This is especially important if colds are present.

C. Symptoms:
Pain, redness, heat, swelling. Sometimes pus, red streaks, swollen lymph glands, or fever are present.

D. First aid:
Physician's care is necessary. First aid, until he can see the patient, is as follows:
1. Keep the patient at rest. Elevate the part slightly.
2. Put on hot applications if there is a delay in seeing the physician. Never touch the wound or attempt to squeeze out pus, etc. This should be done only by a physician.

III. WOUNDS OF THE ABDOMEN:
A. Deep puncture wound:
1. Danger of internal bleeding and injury of organs.
2. Operation is usually necessary.
3. First aid:
(a) Keep patient flat.
(b) Give nothing by mouth.
(c) Maintain warmth.
(d) Apply sterile dressing and binder.
(e) Provide careful, immediate transportation to hospital.

B. Injuries to the abdomen without external wounds:
1. The intestines may be ruptured even if there is no external wound. For this reason, the same first aid procedures should be followed, except the dressing will not be needed.
2. Often it is necessary for the injured to remain in the hospital for several days for observation.

IV. WOUND IN WHICH FOREIGN BODIES REMAIN:
A. Small foreign body with end protruding:
1. Cleanse the area and apply antiseptic, remove the foreign body with sterile forceps and again apply antiseptic and ready-made adhesive gauze compress.

B. Large or deeper foreign body:
1. Do not attempt to remove.
2. Apply sterile dressing.
3. Send worker to a physician.

V. EYE WOUNDS:
A. Dangers:
1. Vision sometimes is seriously affected. A visit to an institution for the blind will show that blindness sometimes follows apparently minor troubles.
2. Foreign body may become embedded and infection and vision damage occur.

B. Avoid the following:
1. Rubbing.
2. Examining with unwashed hands.
3. Use of toothpick or other instrument in removal attempt.
4. Use of eye cup.

C. First aid:
Removal may be attempted if foreign body is not embedded. This is done by inverting the upper eyelid. The following precautions should be taken:
1. Hands should be washed even if one needs to go some distance to do so.
2. A sterile applicator should be used with the cotton tip moistened. A 3" x 3" sterile gauze square may be used if applicators are not available.
3. Do not touch the eyeball. The conjunctiva covering the eyeball can be easily irritated. If there is a foreign body on the eye ball, the worker should be sent to a physician immediately.
4. Do not apply oil or ointment, etc., unless it is the wish of the plant physician.
5. First aid workers should urge workers to wear safety goggles when indicated. Often goggles are furnished, but not worn by the workers.

D. Burns of the eye:
1. Flash burns of the eye (from arc welding): These may often be prevented by shielding arc welding from workers on nearby jobs. Follow treatment recommended by the plant physician only.
2. Chemical burns of the eye:
(a) The longer the chemical remains in the eye, the deeper it will burn; so immediate washing of the eye is of great importance. Running water near the job is the best source of this immediate care. This may be from a drinking fountain or, if possible, from a special eye-washing fountain near the job. The eyelid should be lifted to enable the water to reach as far under as possible.
(b) After washing the eye for at least 15 minutes, a sterile bandage should be applied and the worker taken immediately to a physician.
(c) Neutralizing agents or ointments should not be used, unless an eye physician has given specific instructions to the person rendering first aid.
(d) Face shields or goggles should be provided for and worn by the worker when handling irritating chemicals.

E. Wounds on the eyeball:
These are serious, *even if tiny.*
1. Don't remove any splinter which penetrates part way into eyeball.
2. Keep victim flat on back.
3. Apply pad and loose bandage.
4. Take to physician immediately.

F. Red eyes:
This may mean the onset of an infection, and the worker should be sent to a physician. Some eye infections (for example, epidemic keratoconjunctivitis) are contagious and should not be touched by a first aid worker because of either danger to himself or other workers. An employee with a suspected eye infection should be referred to his physician. Health regula-

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tions require exclusion from work of all communicable diseases, and some eye infections fall within this category.

VI. NOSEBLEEDS:
First Aid:
A. Worker should sit up.
B. Loosen the collar.
C. Apply large cold, wet cloths to nose.
D. Press nostrils firmly together or make pressure on upper lip just below nose, preferably with a pad beneath the upper lip to press against.
E. Have worker *avoid activity*, blowing nose, coughing.
F. If unsuccessful, see physician; meanwhile pack nose gently with gauze, not cotton. Be sure ends of gauze protrude from nostrils so removal is easy and gauze is not forgotten.

VII. INTERNAL BLEEDING:
First aid:
A. Keep patient flat.
B. Provide adequate warmth.
C. Keep patient absolutely quiet. Reassure him.
D. Call a physician or ambulance immediately.

VIII. INTERNAL INJURIES:
A. Treat for shock.
B. Call a physician or ambulance.

Artificial Respiration

I. REASON UNDERLYING USE OF ARTIFICIAL RESPIRATION:
A. With certain conditions, insufficient oxygen gets into the blood.
B. The respiration ceases, but thereafter the heart continues beating a short while. Artificial respiration in this interval may save life until normal breathing begins again.
C. Absence of oxygen carried by the blood to the brain for more than two minutes results in irreparable damage. Once the heart stops, the possibility of saving the worker disappears.

II. CASES BENEFITED BY ARTIFICIAL RESPIRATION:
A. *Non-breathing*, but living victims of:
electric shock,
gas poisoning,
compressions of chest, as by cave in,
prolonged exposure to cold,
puncture wounds of chest,
choking,
excessive alcohol,
drowning,
anesthetics,
poisoning by sleeping medicine,
hanging.
B. Artificial respiration does not help when illness or accident does not permit life. It does not ordinarily help to give artificial respiration to a patient suffering from stroke or infectious disease when the breathing finally stops. In some conditions, such as stroke, concussion, and various types of heart disease, artificial respiration, if given to a breathing patient, may be harmful.
C. The most common cases in industry where artificial respiration may help are gas or fume poisoning and electric shock.

III. IMPORTANT ASPECTS OF ARTIFICIAL RESPIRATION:
A. Remove from contaminated area.
B. Holger-Nielson or back-pressure-arm-lift method of artificial respiration is the standard.
C. *Get started immediately:*
Until the worker can be properly placed for the prone-pressure method, compress the chest with the hand by simple pressure at four- or five-second intervals. While this is being done, have a fellow-worker call the Fire Department and explain the problem. They will come to the plant immediately with a resuscitator and equipment needed. The Fire Department telephone number should be posted near all telephones.
D. See that the breathing passages are open: tongue pushed forward, obstructions removed (such as chewing gum, false teeth, etc.).
E. Keep the worker warm.
F. Keep the worker lying down after recovery; otherwise, he may collapse.
G. Watch the patient in case breathing stops again.

IV. ELECTRIC SHOCK:
A. Prevention. All electrical equipment with which workers come into contact should be periodically inspected by qualified personnel, especially for grounding and insulation.
B. Rescue:
1. Use extreme caution; first aiders can be electrocuted.
2. Turn off current if possible.
3. Remove body from current, if really safe, by means of dry board, dry rope, long dry cloth. *Stand on dry floor.* Do not touch the worker or wire with bare hands. If rubber gloves are at hand, put them on quickly.
C. Special aspects:
1. Body may be stiff at first.
2. Resuscitation should be started immediately and may require several hours.
3. Electric burns should be cared for the same as other burns.

V. GAS AND FUME ASPHYXIATION:
A. Due to lack of sufficient oxygen:
1. Gas which replaces the oxygen may be non-explosive or explosive.
2. Common danger areas: degreasers, tank interiors, garages.
3. Dangers exist in testing for the presence of explosive gas or for lack of oxygen, either by explosions following use of flames or through suffocation.
B. Due to presence of carbon monoxide:
1. Common sources: heating devices—gas, coal or oil burners—gas, coal or oil auto exhaust, closed cars or garages.
2. Sometimes the mixture is explosive and therefore dangerous.
3. Prevention—All products of combustion must be discharged directly out of doors through stacks or exhaust ventilation systems.
4. Symptoms:
Varying degrees of asphyxiation occur. The worker may be only slightly affected, may be unconscious, but breathing, or may have stopped breathing. The skin color varies in carbon monoxide poisoning. Sometimes it is pink or approaches red in spots; sometimes it is pale; again it may have a purple tinge.
5. *Warning:* Gas may be present at the floor level even if a window is open.

XUM

Standard Technique for Executing the Back Pressure–Arm Lift Method of Artificial Respiration

(Courtesy of The American National Red Cross)

Position of the Subject

Place the subject in the face down, prone position. Bend his elbows and place the hands one upon the other. Turn his face to one side, placing the check upon his hands.

Position of the Operator

Kneel on either the right or left knee at the head of the subject facing him. Place the knee at the side of the subject's head close to the forearm. Place the opposite foot near the elbow. If it is more comfortable, kneel on both knees, one on either side of the subject's head. Place your hands upon the flat of the subject's back in such a way that the heels lie just below a line running between the armpits. With the tips of the thumbs just touching, spread the fingers downward and outward.

Compression Phase

Rock forward until the arms are approximately vertical and allow the weight of the upper part of your body to exert slow, steady, even pressure downward upon the hands. This forces air into the lungs. Your elbows should be kept straight and the pressure exerted almost directly downward on the back.

Position for Expansion Phase

Release the pressure, avoiding a final thrust, and commence to rock slowly backward. Place your hands upon the subject's arms just above his elbows.

Expansion Phase

Draw his arms upward and toward you. Apply just enough lift to feel resistance and tension at the subject's shoulders. Do not bend your elbows, and as you rock backward the subject's arms will be drawn toward you. Then drop the arms to the ground. This completes the full cycle. The arm lift expands the chest by pulling on the chest muscles, arching the back, and relieving the weight on the chest.

The cycle should be repeated 12 times per minute at a steady, uniform rate. The compression and expansion phases should occupy about equal time; the release periods being of minimum duration.

XUM

C. First Aid:
1. Remove from contaminated area.
2. Artificial respiration if not breathing.
3. Warmth.
4. Inhalator if available.
5. Physician's care.

Fractures

I. DEFINITION:
A fracture is a break in a bone.

II. KINDS OF FRACTURES (Fig. 5):
A. Closed: Bone broken but no connecting wound from broken area through skin.
B. Open:
1. Bone broken, with connecting wound to surface. Bone itself may have broken through the skin or a missile from outside may have penetrated skin, then struck and fractured the bone.
2. An open break, because of entrance of germs, is much more serious than a closed break.

III. CAUSE:
Falls are the commonest cause in plants.

IV. PREVENTION:
A. Creating a safe environment so that accidents aren't likely to happen. A safety committee in your plant could help with suggestions for improvements.
B. Learning and using safe methods. Falls often occur on stairways when workers run or hurry. This is most apt to occur at quitting time.
C. Teaching others. Reminding fellow workers of precautions to be taken may prevent an accident.

V. INDICATION THAT FRACTURE MAY BE PRESENT:
A. History:
Exactly what happened to the worker?
B. Employee's own ideas:
Does he think a bone is broken?
C. Employee's reactions since accident:
Was he unconscious for a while? Did he walk? How did he protect the injured part?
D. Symptoms:
1. Swelling.
2. Pain on motion about the injured area.
3. Tenderness of the area to touch.
4. Deformity.
E. Pitfalls to drawing a correct conclusion:
1. The history may be misleading.
2. The patient's ideas may be wrong.
3. Symptoms may be few and slight even though serious fracture is present
4. Motion of parts beyond the break may be freely made. Generally some motion immediately at the fracture area is possible, but this usually gives pain. Motion below the fracture is often free and painless. Thus in an elbow fracture the fingers and wrist can be freely moved in many cases.
5. Fractures often give little or no pain while the victim is quiet.
6. The first aider, then, must play the safe side. *Splint when in doubt.*
Never try to have a patient walk "to see whether he can walk" in a possible fracture of the lower extremity.

VI. SYMPTOMS OF AN OPEN FRACTURE:
A. Symptoms of a closed fracture are present.
B. A wound through the skin. Wound may be large or tiny. Bone may or may not still protrude. Bleeding may occur.

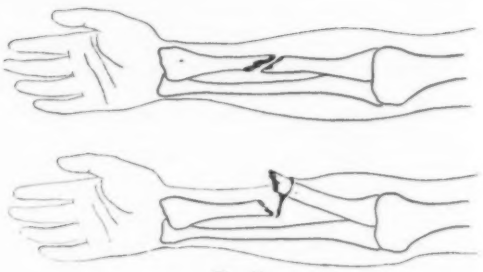

Fig. 5.
Open and closed fractures.

VII. ESSENTIALS OF FIRST AID:
A. For all fractures and possible fractures.
1. Keep the broken ends quiet.
2. Keep the adjacent joints quiet.
3. If a bone is protruding, try to handle the extremity in such a way that the bone will not slip back under the skin. If the bone slips back under the skin there is greater danger of infection or further injury. A special apparatus for transportation may be needed rather than the usual splints.

VIII. IMMOBILIZATION METHODS:
A. Splints, arm slings, pillows and stretchers, or a combination, are used. Splints should be padded.
B. Splints should be sufficiently long. A common mistake is to use splints that are too short.
C. "Splint 'em where they lie" if possible.
D. Occasionally a worker must be moved a short distance before splinting if in a danger area. In such a case, someone should place his hand above and below the fracture area to keep it quiet while others support the weight of the body. Use a stretcher if available.

IX. IMPROVISED SPLINTS:
A. If splints are not at hand, good material for improvised ones should be sought. The first aider must often improvise.
B. Material for improvising should be good. Too small or unwieldy boards are likely to cause more harm than good.

X. CONCUSSION OF BRAIN AND SKULL FRACTURES:
A. Definition of concussion:
In a concussion the brain suffers injury. Concussion may occur with or without skull fracture. First aid is the same with either or both.
B. Symptoms:
1. Unconsciousness or partial unconsciousness for a short time or sometimes prolonged.
2. Cut or swelling on head due to a blow.
3. Headache after blow to head.
4. Bleeding, perhaps only an occasional drop, from ear canal, nose or mouth in severe cases.
5. Pulse may be slow and full; or in some cases rapid and weak.
6. Pupils of eyes may be unequal in size.
7. Face may be flushed or pale.
C. First Aid:
1. Keep patient lying down and quiet.
2. Raise head and shoulders slightly unless a patient is pale.
3. Do not give stimulants.

XUM

4. Keep body moderately warm.
5. Give proper care to bleeding and to wounds.
6. Transport in a horizontal position.

XI. LOWER JAW FRACTURE:

A. Symptoms:
1. Pain occurs in movement of jaw.
2. Teeth of upper and lower jaw may not meet properly, or there may be some irregularity of teeth.
3. Difficulty in eating and talking occurs.
4. Mouth may be open, with drooling of saliva.

B. First Aid:
Bandage around head to hold lower jaw against upper. Remove bandage and support jaw with hand if patient vomits.

XII. COLLARBONE:

A. Symptoms:
1. By running fingers along collarbone from one end to other, a tender, swollen area can usually be felt.
2. Patient supports arm on injured side and will not raise this arm very high. (Don't have him attempt to raise his arm.)
3. Shoulder on injured side is usually lower if arm is hanging.

B. First aid:
1. Full-arm sling.
2. Tie bandage around body, binding arm on injured side to the chest.

XIII. RIBS:

A. Symptoms:
1. Pain in breathing or coughing.
2. Tenderness over fracture area.
3. Blood may be coughed up if lung is punctured.

B. First aid:
1. Bandages around chest while patient constricts chest.
2. If lung may be punctured, do not apply bandage. Keep patient quiet and warm with shoulders raised somewhat.

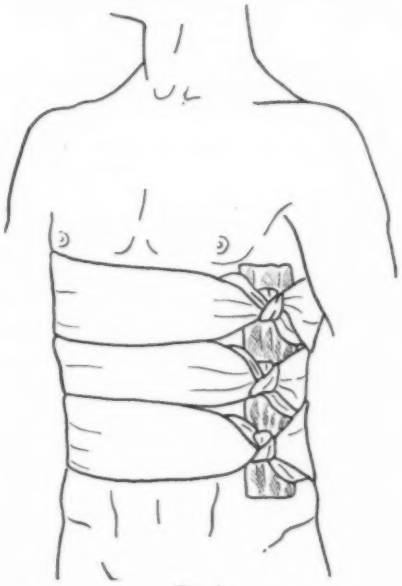

Fig. 6.
Bandage for fractured rib.

XIV. BACKBONE (SPINE) FRACTURES:

A. Spinal cord (the large nerve cord) injury sometimes present:
1. As a result of accident.
2. As a result of improper handling.

B. Causes of spinal fractures:
Falls—even when the landing is on feet or buttocks—explosions, direct heavy blows, crushing accidents.

C. Symptoms:
1. Backache or pain in the neck (sometimes the only symptom).
2. Swelling and tenderness.
3. Paralysis or partial paralysis of one or more extremities, or parts thereof. This is by no means always present.
4. Shock, occasionally severe.

D. First aid:
This is especially important because permanent paralysis or even fatalities may result from improper first aid:
1. Transport on a rigid frame. This frame may be improvised by using available boards or a door.
(a) SUPPORT THE HEAD AND NECK CAREFULLY, especially if injury is in neck or upper back.

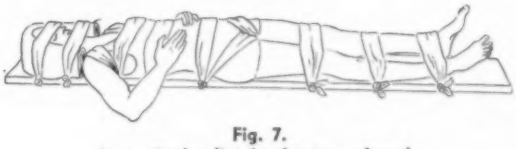

Fig. 7.
Improvised splint for fracture of neck.

(b) Slide patient upon the frame very carefully.
(c) If patient is found on abdomen or side, roll gently to back, rotating neck in line as body rotates.
(d) Bind patient to frame. Use no head pillow, but place effective supports at sides of head. Sand bags or soft hats filled with dirt may be used.
(e) Place a small padding under the small of the back.
(f) Do not bind head, twist body, flex body, or permit patient to sit up.

2. The rigid frame may be placed on a stretcher for transportation.

Fig. 8.
Improvised splint for fracture of back, victim on back on board.

3. If a firm frame cannot be improvised, transport patient on abdomen on a stretcher made of canvas or blanket. But especially in neck fracture cases, this method is not as good as the use of a firm frame. The driver of the ambulance or car taking the patient to the physician or hospital should avoid jars and sudden stops.
4. In neck fracture cases it is much better to get a physician to the scene for danger to

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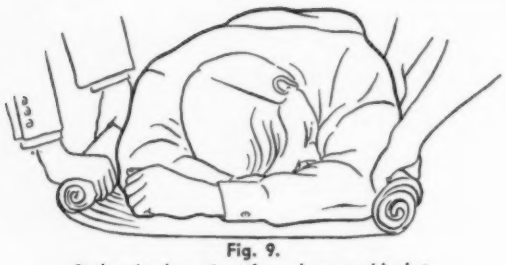

Fig. 9.
Broken back, patient face down on blanket.

life is especially great. If this is impossible, first aider may well steady the patient's head throughout the transportation period. Don't let the neck tilt forward, sideways or backward.

XV. THIGH OR HIP FRACTURE:

A. Symptoms:

1. Shock may be severe, though not always evident at once.
2. Extremity often turns outward.
3. Patient will seldom support himself on the extremity. He should never try to do so.
4. If fracture is near the very top of the bone, there may not be any local signs. But the patient, while on his back, often won't lift his heel from the ground.
5. If fracture is lower, deformity, tenderness, swelling, may be evident.
6. Even with fracture of thigh, victim can move ankle and toes.

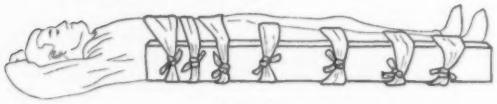

Fig. 10.
Improvised splints for fracture of thigh.

B. First Aid:

1. Splint on the side of the body from armpit to just beyond the foot.
2. Second splint, full length of body and leg, may also be applied.
3. If splints are not at hand, bandage limb to opposite limb.
4. Give proper shock care always.

XVI. LEG:

First Aid:

1. Pillow or folded blanket extending above and beyond the knee and beyond the ankle.
2. A splint may be applied outside this pillow or blanket on each side.
3. If a pillow is not available, two splints may be used, one on each side, extending from heel to well beyond knee.

XVII. FRACTURES OF THE ARM (PART ABOVE THE ELBOW):

These are often not suspected at first.

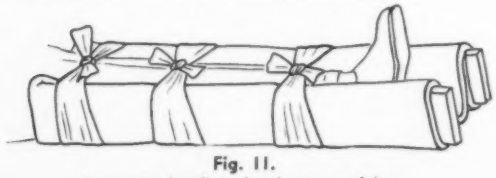

Fig. 11.
Improvised splints for fracture of leg.

First Aid:

1. One splint from shoulder to elbow; outer side of arm.
2. Cravat sling to support forearm. Bandage arm to side of body. Always protect armpit by padding there.

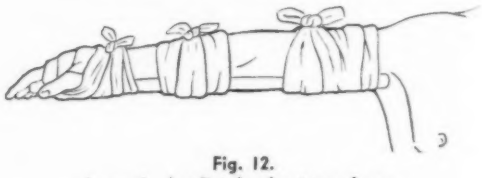

Fig. 12.
Improvised splint for fracture of arm.

XVIII. FOREARM AND WRIST:

First Aid:

1. On palm side place a splint extending from elbow to fingertips.
2. On opposite side place a splint extending from elbow beyond the waist. Bandage both splints into place.
3. Apply arm sling.

Fig. 13.
Arm sling from triangular bandage.

XIX. HAND FRACTURE OR CRUSHING:

First Aid:

1. One splint, palm side, from middle of forearm to beyond fingertips.
2. Arm sling.

XX. BRUISES:

First Aid:

Cold applications at first—24-48 hours.
Later heat—after 24-48 hours.

Transportation

I. INTRODUCTORY REMARKS ON TRANSPORTATION:

A. Importance:

In actual first aid work, transportation is exceedingly important. In a large proportion of accidents, it requires the main attention of

the first aider. Improper transportation increases the danger to life and limb, increases the pain, prolongs the hospital and disability time and raises the expense.

B. Notifying the physician or hospital:

1. Often it is wise to call the physician to the accident scene. Life and limb are precious and sometimes both may be saved by not moving the patient.
2. When notifying the plant physician, the first aider should give needed information and should not end the telephone conversation until he is sure his questions are answered and advice is given. Give the address of the plant, the nature of the injury or illness as known, and request advice concerning immediate care.
3. It may be necessary to notify the hospital that an emergency case is coming. Sometimes the hospital beds are all filled, or a physician may not be at hand. If the physician is participating, he usually will notify the hospital.

C. Planning the transportation method:

Planning comes first in transportation procedures:

1. Exactly what is to be done?
2. Exactly what procedure must be followed: For instance, must the patient be carried to the vehicle; exactly how must he be placed in it?
3. Exactly what materials are needed?
4. Exactly what is the duty of each helper in carrying the patient and in placing him in the vehicle?

These questions should be answered by the first aiders before getting started. The patient should not be bothered or worried by questions or discussion of the matter, although a brief question or two directed to him may be necessary. It is poor first aid to start placing the injured in a vehicle and then find that needed materials are not at hand or that the method attempted does not work. It is bad to subject sick or injured persons to procedures which tire them before transportation. They shouldn't help with the planning or be disturbed by it.

D. Transportation methods:

1. Few cases require breakneck speed. Many are benefited if delay occurs before transportation is attempted. With most patients, care rather than haste in driving is important.
2. The stretcher is extremely valuable in short or long transportation. Stretchers may sometimes be improvised by the use of the following:
   (a) Poles and blanket.
   (b) Poles and coats or vests.
   (c) Blanket properly rolled.
   (d) Other improvizations may be side board, boards fastened together, doors, screens or ladders properly covered with boards.
3. Loading a patient upon a stretcher and unloading him properly is much more important than one may believe.
4. If the worker is unconscious, the hands should in most cases be tied. If he is conscious, the hands may be left free.

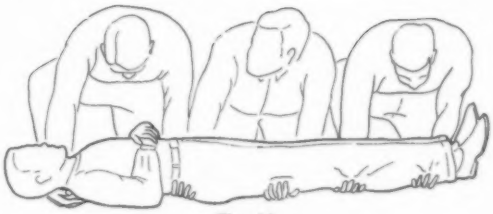

Fig. 14.
Three-man carry, stage one.

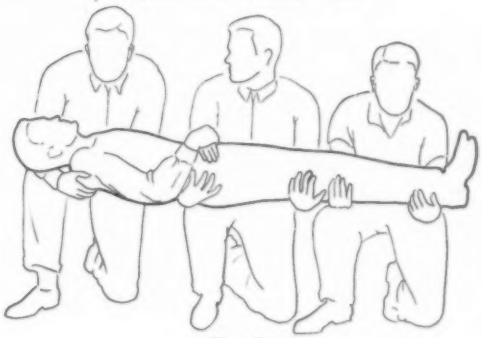

Fig. 15.
Three-man carry, stage two.

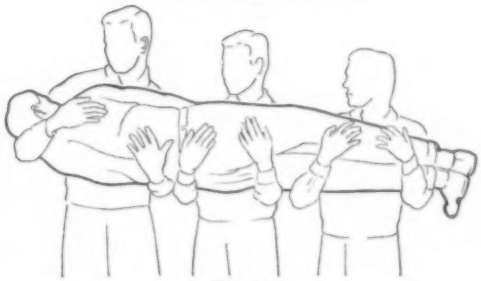

Fig. 16.
Three-man carry, stage three.

Dermatitis (Skin Trouble)

I. DEFINITION—dermatitis is an irritation of the skin evidenced by itching, redness and various skin lesions.

II. CAUSE—There are many causes of dermatitis but the commonest cause in industry is the contact of an irritating substance to the skin. Of these substances cutting oils are the commonest.

III. PREVENTION—A great deal can be done to prevent dermatitis.

A. Cleanliness is a very important factor.

1. Frequent washing of the hands and arms or any part of the body coming in contact with the irritating substances.
2. Frequent change of work clothes that are oil soaked or are contaminated by other irritating substances is very important.
3. Avoid washing hands in gasoline, kerosene, carbon tetrachloride, etc., as these could in themselves cause dermatitis.

B. Prevent the substance from coming in contact with the skin.

1. This may sometimes be accomplished by the use of protective clothing, gloves, shields, aprons, rubber boots.

XUM

2. Using protective creams.

IV. First Aid:

Follow all instructions of plant physician carefully. Often dermatitis is made worse by home remedies and too much treatment. Early care by a dermatologist is by far the best.

Burns

I. DEFINITION:

A burn is caused by dry heat or flame.

A scald is caused by steam or hot liquid.

Chemical burns are produced by the chemical action on the tissue.

Electrical burns may be caused by the passage of current through the tissue or by the electric flash which damages the skin and is not deep.

II. ESCAPE AND RESCUE:

Previous plans for use in case of fire in the plant should have been made: procedures, avenues of escape, location of fire extinguisher, fire alarm, and so forth.

A. Keep low.

B. Protect the hair, face, hands.

C. Do not breathe superheated air—one breath may be fatal. Open doors cautiously. A cloth, preferably heavy and wet, gives protection to face against flames and heat but not against carbon monoxide.

D. Keep doors and windows closed.

E. Don't run if clothes or hair catch fire. Lie flat, roll in blanket, and so forth.

F. Jump dangerous distances only as a last resort.

III. DANGERS:

The immediate dangers, important for first aid, are *shock* and infection.

IV. FIRST AID:

A. Small burns.

Apply medication recommended by your plant physician.

B. Extensive burns.

1. Remove clothing except what sticks to burn area.
2. Follow instructions of your plant physician. The wrong application may hinder further treatment. If your physician wishes soda bicarbonate or Epsom salts applied it should be done by making a solution of warm water with three tablespoonsful to a quart of water.
3. Keep patient warm—care for shock.
4. Some don'ts:

Don't use absorbent cotton on a burn.

First aiders should not remove wax or metal-like substances from burn.

First aiders should not open blisters.

C. Chemical burns of the skin:

1. Here again immediate washing with large amounts of water is important so that the chemical will not burn deeper.
2. For acid burns—after washing freely with water a saturated solution or a paste of bicarbonate of soda may be applied.
3. For alkali burns—after washing with water, a 2% solution of acetic acid (2% vinegar) may be applied.
4. For phenol (carbolic acid) burns—after washing with water, apply 70% alcohol.
5. Extensive burns will need further treatment by the plant physician. Small burns after the above procedure may be treated with a burn preparation recommended by the plant physician.

Common Medical Emergencies

I. HEART ATTACK:

A. Symptom types:

1. Cases resembling fainting.
2. Cases having pain.

Pain may be in the chest or upper abdomen, and may extend along the left arm. Fear of death may be great. Nausea or vomiting may occur.

3. Cases marked by shortness of breath. These patients breathe best while sitting up. When the patient is unconscious, it will probably be difficult or impossible to know whether heart failure occurred. If conscious, the patient may give helpful information. A mild heart attack may be followed by a serious one.

B. First Aid:

1. Keep the patient lying down. If short of breath, he may be propped up to aid breathing.
2. Keep him quiet.
3. Coffee or tea may be given.
4. Provide moderate warmth.
5. Call physician immediately.

II. CONVULSIVE STATES:

A. Symptoms:

1. Onset is sudden though sometimes the patient realizes an attack is coming on.
2. Patient in full attack falls, sometimes cries out, loses consciousness, threshes about, may bite tongue. Attack lasts only a few minutes or less *usually*, but sometimes much longer.
3. Some cases show only a moment's unconsciousness, no other symptoms.
4. Drowsiness and sleep usually follow the full attack. Patients occasionally appear to be abnormal for a few minutes to an hour or more after an attack.

B. First Aid:

1. Protect patient from injuring himself as he threshes about, but do not try to prevent the threshing.
2. Protect the tongue. Place a pencil wrapped in cloth, or a folded cloth or other suitable material between the teeth to prevent the tongue from being bitten.
3. Give no stimulant.
4. Permit patient to sleep. Do not embarrass him by discussing the trouble, or referring to it. These patients are often very sensitive. Attacks may recur shortly especially if patient resumes activity too soon.

III. SIMPLE FAINTING:

A. Prevention:

1. Have patient lie down if fainting seems about to occur, as from fear.
2. Bend head between knees, if sitting position may be maintained.
3. Sometimes very healthy people faint at the sight of their own blood. Injuries have occurred from fainting, when a worker has received a very minor cut. For this reason all first aiders should have the worker sit down even when applying a ready made adhesive compress.

B. First Aid:

Fig. 17.
Procedure for applying band-aid.

1. Keep patient lying down for some time. Fainting otherwise may occur.
2. Aromatic spirits of ammonia may be held under the nose. Don't use ammonia in a bleeding case, however.
3. After consciousness returns, a stimulant (coffee or tea) may be given.
4. If unconsciousness is prolonged, keep the patient warm and call a physician.

Miscellaneous Medical Conditions

I. BOILS:
- A. Caused by germs on the body surface which penetrate or are rubbed into glands or hair roots.
- B. Do not squeeze boils. Some germs may be squeezed into tiny blood vessels and cause very serious internal infections.
- C. Boils on face and inside nose are especially dangerous.
- D. Industrial first aiders should not take any responsibility of treating boils but should refer them to their family physicians. *Exception:* If the worker has been on an oily job and the first aider is suspicious of the job causing the condition, they should be referred to the plant physician.

II. COLDS:
- A. The main treatment for colds is rest.
- B. Any medications given should be recommended by a physician. The fact that a drug is advertised to cure a cold does not mean that it is safe for distribution in a plant.

III. HERNIA:

There are various places where rupture may occur. The most common is in the groin. Pressure within the abdomen or a loop of bowel pushes against a weak spot in the wall at that point and causes a swelling to appear.

Prevention—worker should always practice proper lifting procedures.

FIRST AID:
- A. Call a physician. Some cases are emergencies.
- B. If pain is severe, lay the patient on his back and apply cold compresses to the area.
- C. If procedure B does not help, have patient lie on his abdomen and gradually bring his knees under the chest so that buttocks are high.
- D. If procedure C does not help, return again to procedure B.

IV. TOOTHACHE:

Ache in a tooth region may be caused by a cavity, gum infection or other causes. If due to unhealthy teeth and gums, it indicates improper earlier care and inadequate dental attention. Today the wise person gets dental attention regularly.

Most dentists will work on an emergency dental case between appointments. First aid treatment giving temporary relief should not be used to replace the early dental care.

V. SIMPLE HEADACHE:
- A. If management wishes medication given for headaches it should be given according to the direction of the plant physician.
- B. Workers having frequent headaches should be advised to see their family physician.
- C. If many workers in one section of the plant have headaches, nausea, etc., the working environment should be inspected.

III Effects of Excessive Heat

I. BODY CONDITIONS RESULTING FROM EXCESSIVE HEAT:
- A. Sunstroke or heatstroke.
- B. Heat exhaustion.
- C. Heat cramps. Danger greater to aged, feeble, and fat persons, alcohol addicts and the very young.

II. PREVENTION:
- A. Use of salt.
- B. Proper clothing.
- C. Light diet.
- D. Adequate fluids, with salt, but restriction in use of alcohol, iced tea, iced coffee and ice water. Fluids may be taken freely, frequently, rather than in large amounts at one time; salt should be added.

III. SUNSTROKE OR HEATSTROKE:
- A. Symptoms:
  1. Hot, dry skin.
  2. Flushed face.
  3. Fast, full pulse.
  4. High temperature, usually above 104° and with serious cases above 107° F.
  5. Unconsciousness if case is severe.
  6. Headache.
  7. Dizziness.
  8. Nausea and vomiting.
- B. First Aid:
  1. Bring patient to shady, cool place, and remove clothing.
  2. Apply cold to the head.
  3. Cool the body gradually.
     (a) Pour water on victim after wrapping him in a sheet, or

XUM

(b) Give cool bath, up to 20 minutes with massage, or
(c) Sponge with cold water.
Treat during transportation to hospital.
4. No stimulants.

IV. HEAT EXHAUSTION:
A. Cause:
Exposure out-of-doors, or in hot rooms, with loss of body salt.
B. Symptoms:
1. Clammy skin, with sign of perspiration.
2. Pale face.
3. Weak pulse, which may be rapid or about normal rate.
4. Temperature about normal; may be somewhat elevated or lowered (low in comparison with heat stroke cases).
5. Unconsciousness occasionally.
6. Headache.
7. Dizziness.
8. Nausea and vomiting.
9. Muscular weakness.
10. Heat cramps.
C. First Aid:
1. Remove patient to circulating air.
2. Keep patient flat and warm.
3. Stimulants may be given.
4. Salt, up to total of 1 tablespoonful in a small amount of water, should be given gradually, then diluted salt water over a period of time.

V. HEAT CRAMPS:
First Aid:
1. Same as for heat exhaustion.
2. Firm hand pressure to affected muscles.

Poisons

I. KINDS FOUND IN INDUSTRY:
A. Chronic poisoning may occur from certain substances used in a plant if recommended precautions are not taken. Chronic poisoning does not call for first aid but rather adherence to safety measures and physical examination by a physician. Example of safety measures—removing materials and loading degreasers in approved method.
B. Acute poisoning.
1. First aid for poisoning from gas or fumes have already been discussed.
2. Ingested poison (commonest cause in industry is from a worker drinking a poisonous liquid from a coca cola bottle, whiskey bottle or container assumed to contain a drinkable liquid).
(a) Prevention—do not use these bottles.
First Aid:
Physician should be called in all cases.
1. Dilute poison *immediately*.
Administer large amounts of fluid—4 to 7 glassfuls of baking soda in water, soapy water, tap water, and so forth; or milk especially if ammonia, lye or other caustics have been taken.
2. Induce vomiting.
The diluting fluid may cause vomiting. Thus, a teaspoonful or two of baking soda in water, repeatedly taken, often leads to vomiting. Tickling the back of the throat may cause vomiting.
3. Antidote, if known, may be given after stomach is washed out or even in the diluting fluid.
4. Epsom salts may be given also. A heaping tablespoonful in water is the dose for adults.
5. Treat shock in all cases.
6. Special measures if poison is alkali such as lye, or acids.
(a) Do not attempt to induce vomiting in these cases.
(b) For acids:
Give baking soda water, lime water, milk of magnesia, or powdered chalk; if not available, give water. Then give milk, olive oil, or egg white.
Keep patient warm.
(a) For Alkalis:
Give weak acid, such as vinegar or lemon juice and milk. If not available give water.
Keep patient warm.

First Aid in Civil Disaster

A PERSON trained in first aid has increased value to himself, his employer, and his community. Emergencies may arise, in the course of everyday living, that are relatively small; greater emergencies may also occur, such as fires, tornadoes, floods, or explosions. All of these require at short notice large numbers of trained people to give first aid to the injured. Experience in the Boston night club fire, the Texas City explosion, the Noronic steamship fire and in other disasters shows the importance of having available large numbers of persons accustomed to giving emergency care. Should the present threat to world peace become open war, first aid training would immediately become an important personal responsibility.

First aid rooms with adjacent space can be utilized as centers for emergency casualty care, and are included in the civil disaster organizations of most large cities. It is important that the following factors be considered *in advance* of a large-scale emergency:

1. *Space.* A fairly large area adjacent to the first aid room will be needed to which the injured can be brought in large numbers. It should be remembered that 18 square feet of floor space will be the minimum requirement for each litter case. Here the preliminary examination can be made, emergency care given, and the patient prepared for evacuation to a permanent hospital. Minor and walking casualties can be cared for in the first aid room.

2. *Identification.* Experience shows that this is a most important phase of first aid in civilian disasters. A ring, a pin, or a set of keys may be the only means of identification. Everything removed from the patient must be placed in one container, such as a paper bag, and labeled with the same information as is placed on the patient. For this purpose, a shipping tag is ideal. If the patient is unconscious, a numbering system must be used. In addition, a card record must be kept, which will show where the patient was sent.

3. *Supplies.* One can hardly expect each first aid room to stock-pile sufficient supplies to take care of any emergency. It is important, however, that enough basic supplies be available to enable first aid care to be given for at least two hours, when one would anticipate replenishment from outside sources. The most needed supplies will be those used in the emergency care of hemorrhage, shock, burns.

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Relationships between Industrial and Private Physicians
— Code of Ethics —

Lake County (Indiana) Medical Society

IT IS appreciated that no laws, rules or regulations can be made that will apply to all equally. No rules can displace common sense and good judgment. In order that we may more nearly approach the golden rule in the relation between industry, labor and the medical profession, the following principles are submitted.

1. *Pre-employment examinations.* It is recognized that the physical examination of applicants for work is the prerogative of an employer; that the time and place of such examinations are matters within his jurisdiction; and that he must have free choice of the physician who is to make the examinations. The foregoing assumes that the employer pays the entire cost of the medical service rendered. The examining physician in this circumstance is performing a service for the employer, and has primarily the single obligation to further the employer's interest. It is recommended, however, that in the broader interest of the community he accept the following rules of practice: (a) Make available to the personal physician of an examinee a full report of the latter's examination; this to hold only in the event an examinee requests that a report be made. (b) Willingly consult with the examinee's personal physician when differences in opinion regarding medical findings exist. (c) Refrain from naming a practitioner to whom the examinee should report for correction of defects discovered in the examination.

2. *Occupational Diseases and Injuries.* The treatment of occupational injuries and diseases is the direct concern of an employer, and the facilities and physicians provided by him for that purpose must remain within his discretion. The employer is best served in these instances by physicians and surgeons who observe the general rules of ethics of their profession. Specifically the following points of conduct are considered important: (a) It is not ethical for an industrial surgeon, while caring for an industrial injury or disease case, to urge the patient to have a concomitant and coincidental disease treated by himself at the worker's expense. (b) Once a case of questionable liability to the employer is diagnosed as being of non-occupational origin the patient is to be referred to his personal physician for further care. (c) In general, a physician or surgeon is not to use his individual affiliation as a direct means of gaining a private practice among plant workers. Emphasis is placed here on solicitation, low fee arrangements, and insinuation of reprisals against those workers who insist on care by physicians of their own choice.

Companion obligations rest with non-industrial physicians and surgeons in these matters: (a) When a private physician suspects the diagnosis of an occupational disease or injury in a patient, he should with his patient's permission, communicate the information to the proper plant doctor. (b) When differences of opinion exist as to the compensability of medical and surgical conditions the private physician, with the permission of his patient, is to confer with the plant doctor. (c) Statements to workers that occupational diseases or injuries were not properly treated accomplish nothing constructive, and in any case the expression of such opinions is to be withheld until there has been consultation with the plant physician for the purpose of ascertaining all pertinent facts.

3. *Health Supervisory Programs.* Health Supervisory Programs may be properly carried on by an employer's medical personnel, if the purpose of the program be any or all of the following: (a) To discover cases of occupational disease among employees exposed to known health hazards. (b) To diagnose all possible illnesses which may influence adversely the earning capacity of workers or plant safety. (c) To determine if workers returning from sickness absences have recovered sufficiently to carry on their jobs without injury to themselves or endangering the safety of others.

With respect to such programs the Society considers certain ethical principles to be basic. They are: (a) The result of clinical examinations must be made available to the personal physicians of the examined employees. (b) No influence is to be brought to bear on employees in their selection of personal physicians for the correction of physical defects. (c) No treatment for non-occupational diseases or injuries to be offered at the company's medical department, except in minor cases when enough treatment may be furnished a worker to make it possible for him to complete a turn of work with a minimum of injury and discomfort to himself. (d) It is recognized that the plant physician is best qualified to judge a worker's ability to return to his particular job after an illness. In the interests of harmony in the medical community, when there is conflict of opinion in such cases between the worker's personal physician and the plant physician the latter shall, at the request of the personal physician consult with him on the case.

4. We recommend that all industries have doctors of their own choice, who are to act in the capacities of consultants or as attendants at plant medical departments. We believe records of the physical status of all employees are valuable as protection to both employer and employee.

5. It is against the policy of the medical profession to have any free medical examinations in any industry for whatever purpose, unless having been first submitted to and passed by the council of the local Medical Society. We do believe in, and encourage research work that may bring knowledge to the medical profession and benefit to mankind, but severely condemn the abuse of research for commercial purposes.

6. *Medical Testimony before the State Industrial Board.* Any member of the Lake County Medical Society who has submitted expert medical testimony at a hearing before the State Industrial Board in a suit for compensation may petition the Coun-

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This Code was prepared by the Industrial Health Committee of the Lake County (Indiana) Medical Society, under the Chairmanship of E. S. Jones, M.D., of Hammond. It has since been adopted by the Indiana State Medical Society.

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cil to review all of the medical testimony submitted at that hearing. The petition must be made after a final decision in the case has been reached. The council will have discretionary power in the matter of deciding whether or not to review the case. Once the decision has been made to review, the Council will make a reasonable effort to arrange a convenient time and place for the review. All of the physicians who submitted testimony at the hearing in question will be apprized of that time and place, and must be permitted to attend the review. The Society has the duty to censure any of its members for apparently flagrant deviations from the Society's standards of competency and honesty, as revealed in such a review.

7. If an industry wishes to administer vaccine on an experimental basis with the full knowledge on the part of the industry, the physicians, and the employees that the program is purely experimental and not therapeutic, then in view of the experience that might be obtained statistically, the committee would not be opposed; however, the administration on any other basis would be unfair not only to the profession but also to the industry and to its employees. In any case such a program would be carried out at the sole expense of the management.

Residency Program—Medicine in Industry

THE inauguration of a residency training program in Medicine in Industry was recently announced by the Medical Department of the Standard Oil Company (New Jersey). This program has two major objectives: first, to provide practical experience and training for qualified graduate physicians to fit them for the practice of medicine in connection with modern industry; second, to help the candidate qualify for specialist certification or degree.

Thomas C. Fowlkes, M.D.

Single graduates of an approved medical school who have already completed at least one, or preferably two, years' internship in an approved hospital, and who have an interest in industrial medical practice, are the group from which candidates will be considered.

For the most part, existing company facilities and staff will be used in the training program. The resident will be considered as a temporary employee and will receive a liberal compensation. The total duration of the residency at the present time is 18 months. Six months will be spent in the Medical Departments of the Standard Oil Company (New Jersey) and its domestic affiliates, and 12 months in the Medical Department of the Lago Oil & Transport Company, Limited, a Jersey affiliate operating in Aruba, Netherlands West Indies.

During the six-month period in the United States, the resident will receive a didactic orientation course which will cover all phases of Medicine in Industry. Practical experience will be obtained through observation and participation in dispensary and diagnostic unit activities in New York and in medical dispensaries of nearby Jersey affiliates.

The 12 months' overseas service in Aruba should give broad practical experience in the various phases of industrial medical practice. A comprehensive series of assignments in the plant dispensary, marine dispensary, and hospital services of the Lago Company, together with practical examples of the integration of medical service with other departments of the organization should afford a sound background in the clinical and administrative experience required of a physician employed in modern industry.

The first physician to participate in this program, THOMAS C. FOWLKES, M.D., of Selma, Alabama, recently left for Aruba where he will spend one year with the Lago Oil & Transport Company, Limited. He was selected from a list of over 50 candidates who had applied for the first opening in the residency program. At the end of his year of training at Aruba, he will spend six months in additional training under the supervision of the Standard Oil Company (New Jersey) Medical Department.

DR. FOWLKES received a Bachelor of Arts Degree at the University of Alabama in 1939 and his Medical Degree at the University of Virginia Medical School in 1943. He saw service for three and a half years with the United States Army in World War II, two years of this in Europe. After his discharge from the service with rank of Major in the Medical Corps, he served in various positions in industrial medical work, and with the Veterans Administration.

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INDUSTRIAL MEDICAL ASSOCIATION

The President's Page

THE PRESIDENT'S PAGE will be carried on during the coming year as in the past. This medium has proved the most effective means of bringing the official actions of the Association to the entire membership. During the past year DR. KAMMER capably outlined the functions and responsibilities of the officers of the Association. The delegation of authority and responsibility to the President-Elect and to the First and Second Vice-Presidents, which was so well established during the past year, will be continued. This plan has been found most effective, and has built a much stronger Executive Committee.

Our objectives for the coming year may be outlined as follows:

1. To strengthen our Association by gaining additional members. Our goal for 1952 is a thousand new members. We know this is not an unreasonable objective. In each locality there are numerous physicians practicing Industrial Medicine who meet all the requirements for membership; but in many instances they have not been approached in regard to membership in the IMA. Obtaining an increase in the membership will not only aid the IMA, it also will definitely strengthen the component groups as well. The increase will have other advantages, such as, giving greater strength to the movement of Industrial Medicine. It will aid our financial situation, and will help in emphasizing the importance of under-graduate and post-graduate education in our field. The task of gaining this goal of a thousand new members should be the responsibility of the officers of each component group, as well as the district counselors. No single officer or group of officers can hope to accomplish this objective without the wholehearted assistance of the entire membership. If each member would make it his responsibility to obtain one new member we would swell our ranks well beyond our goal of the added thousand.

2. Our second objective is that of gaining recognition through the American Board of Occupational Medicine. Every possible effort will be put forth by our officers to carry on this movement, until we are able to gain recognition as a full specialty. We will attempt to cooperate in every way with the Council on Industrial Health of the American Medical Association, and the American Academy of Occupational Medicine, in this important program. While the present leaders in Industrial Medicine are cognizant of the ever-widening aspects of this objective, it is not entirely the product of their effort, but much of the credit must go to the pioneers in the field of Industrial Medicine. It was their persistent effort, courage and inspirational leadership which gave our present leaders, the spirit and enthusiasm to carry on. If we are able to achieve recognition during the coming year, we must remember that with every accomplishment come new and greater responsibilities, which must be fulfilled if progress is to be continued. The quality of medicine and the service we render industry and the worker is the measure by which we will be judged.

3. Our third objective is to exert our influence as individuals, and collectively as an Association, with our local medical societies, in order that we may emphasize the importance of Industrial Medicine. We should stimulate a high degree of cooperation between the private practitioners and the industrial physicians. We must make every effort to emphasize to the private practitioner, that the effective use of manpower depends on job placement. The physician is the only person qualified properly to evaluate an individual's physical capacity to work. We must work together in reducing the tremendous waste of man hours, which is so great at the present.

4. Our fourth objective is to assist management in defining the need for, and the results which can be expected, with an adequate medical program. It is our responsibility to establish channels of direct contact with top management levels, in order to inform them of their medical needs; and also to acquaint them with the tremendous contribution a sound medical program can make to more efficient business operation.

5. Our fifth objective is to emphasize to the medical schools the importance of incorporating more training in Industrial Medicine in both the under-graduate and post-graduate years of medical education. If we are to continue to progress, in the effort to which we have dedicated ourselves, we must have the cooperation and help of the medical schools.

6. Our sixth objective is most important—the members of the Industrial Medical Association must take an active interest in the activities of the local medical societies and in their respective component groups. If we are to gain strength in this field, we must have that strength in the basic unit, as well as the parent organization.

Today Industrial Medicine stands on the threshold of a new era; an era of new and broader responsibilities, an era of real challenge —a challenge to industrial physicians, to medical students, to educators, and to everyone engaged in the field of Industrial Medicine. How well we meet this challenge will determine in great measure our future progress to be manifested in the future health and happiness of mankind.

E. A. Irvin, M.D.

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INDUSTRIAL MEDICAL ASSOCIATION

Awards

AWARD presentations were made at the Annual Banquet of the INDUSTRIAL MEDICAL ASSOCIATION and the other organizations participating in the Health Conference, Wednesday evening, April 23. Four awards were given.

MAX R. BURNELL, M.D., Medical Director, General Motors Corporation, Detroit, received the Knudsen Award.

EDWARD H. CARLTON, M.D., Medical Director, Inland Steel Company, was given the Association's Meritorious Service Award.

THE CITATION for Health Achievement in Industry was awarded to the East Liverpool District Potteries, East Liverpool, Ohio. Six companies are identified with the Employee Medical Service presided over by JOSEPH T. NOE, M.D. These companies are: The Edwin M. Knowles China Co.; The Hall China Co.; The Harker Pottery; The Homer Laughlin China Co.; The Sterling China Co.; The Taylor, Smith, Taylor Co.

THE CITATION for Excellence in Medical Authorship recognized the article, "Epidemiology of Beryllium Intoxication," by JAMES H. STERNER, M.D., and MERRILL EISENBUD, in *Arch. Indust. Hyg. & Occup. Med.*, 4:2, 123 (August) 1951.

FELLOWSHIPS in the Industrial Medical Association were awarded to the following:

LEONARD SWENSON ARLING, Minneapolis, Minnesota.
CHESTER BADERTSCHER, Cleveland Heights, Ohio.
PRESTON NICHOLS BARTON, Bristol, Connecticut.
ROBERT L. BAIRD, Dixon, Illinois.
CLARENCE A. BARNES, Waukegan, Illinois.
LEWIS T. BAXTER, Chicago, Illinois.
RODNEY RAU BEARD, San Francisco, California.
ELSTON LEWIS BELKNAP, Milwaukee, Wisconsin.
ERWIN CARL BINSTADT, Cincinnati, Ohio.
LAMSON BLANEY, Springfield, Massachusetts.
F. F. BOYS, East Chicago, Indiana.
R. RALPH BRESLER, Philadelphia, Pennsylvania.
ALLEN MANSFIELD COLLINSWORTH, Atlanta, Georgia.
LEO KENNETH COOPER, Gary, Indiana.
MAXWELL MELVILLE CORBETT, Chicago, Illinois.
EDWARD R. COTTER, Indiana Harbor, Indiana.
CARL ULRICH DERNEHL, Texas City, Texas.
ROBERT EDWARD DONOVAN, Arlington, Massachusetts.
DANIEL EGELAND DORCHESTER, Sturgeon Bay, Wisconsin.
THOMAS LEO DWYER, Mexico, Missouri.
HAROLD EARNHEART, Chicago, Illinois.
LLOYD A. ELLIOTT, Elkhart, Indiana.
ARTHUR NILS ERICKSEN, Reading, Pennsylvania.
JOHN ROBERT ERWIN, Seattle, Washington.
PHILIP FALK, Chicago, Illinois.
FREDERICK L. FINCH, Richmond, Virginia.
DAVID FISHMAN, Cleveland, Ohio.
JACOB C. FLEISCHER, East Chicago, Indiana.
WALTER E. FLEISCHER, Baltimore, Maryland.
JOHN HENRY FOULGER, Wilmington, Delaware.
WILLIAM DOANE FRAZIER, Narberth, Pennsylvania.
JAMES FRENKIL, Baltimore, Maryland.
WILLIAM JAMES FULTON, Detroit, Michigan.
DWIGHT ISAAC GEARHART, Chicago, Illinois.
GEORGE HOWARD GEHRMANN, Wilmington, Delaware.
STANLEY JOSEPH GIRYOTAS, Chicago, Illinois.
FRANCIS JOHN HALFORD, Honolulu, Hawaii.
ALLAN K. HARCOURT, Indianapolis, Indiana.
LESTER HART HERGESHEIMER, Philadelphia.
GAYLORD R. HESS, Chicago, Illinois.
EMIL J. C. HILDENBRAND, Washington, D.C.
WARREN L. HOGUE, JR., Akron, Ohio.
JOHANNES M. L. JENSEN, Chicago, Illinois.
DAVID R. JOHNS, East Chicago, Indiana.
WALFRED JOHNSON, Worcester, Massachusetts.
BURTON C. KILBOURNE, Chicago, Illinois.
JOHN MARTIN KIMMICH, Haverford, Pennsylvania.
ALLEN HAROLD KNAPP, Milton, Massachusetts.
JOHN A. KOLLAR, Chicago, Illinois.
EDWARD FRANCIS KUBA, Chicago, Illinois.
HANS W. LAWRENCE, Cincinnati, Ohio.
DAVID JOSEPH LEWIS, Springfield, Illinois.
LAUREN NORTON LINDENBERGER, Troy, Ohio.
EDGAR KERN LINDER, Philadelphia, Pennsylvania.
CLARENCE LEE LLOYD, Los Angeles, California.
JOSEPH SEBASTIAN LUNDHOLM, Rockford, Illinois.
JOHN F. LYONS, Cincinnati, Ohio.
LEONARD MASON LYONS, New York, New York.
LEMUEL CLYDE MCGEE, Wilmington, Delaware.
HENRY K. MONTGOMERY, Dayton, Ohio.
GEORGE E. MORRIS, Boston, Massachusetts.
GEORGE OSBORNE NELSON, New York, New York.
EDWIN J. NUGENT, Indianapolis, Indiana.
J. J. O'HALLORAN, Moline, Illinois.
NICHOLAS ASA OST, Fort William, Ont., Canada.
PAUL T. PALMER, Peoria, Illinois.
DAN HOLLOPETER PERSING, Philadelphia.
ROGER WILLIAM POBORSKY, Chicago, Illinois.
FRANK PRINCI, Cincinnati, Ohio.
ROLAND I. PRITIKIN, Rockford, Illinois.
WILLIAM J. RALSTON, JR., Lorain, Ohio.
PETER B. RASTELLO, Detroit, Michigan.
HOWARD LORENZO REED, Wilmington, Delaware.
GRADIE RAYMOND ROWNTREE, Louisville, Kentucky.
HENRY H. RUBIN, Chicago, Illinois.
LLOYD DEWITT RUGH, Tarentum, Pennsylvania.
K. G. RUNDSTROM, Chicago, Illinois.
LESTER W. SANDERS, Cincinnati, Ohio.
CHARLES LINWOOD SAVAGE, Waynesboro, Virginia.
PAUL MILBURN SCHILDNECHT, Lancaster, Pennsylvania.
EDWARD J. SCHOWALTER, Chicago, Illinois.
DAVID SCHREIBER, New York, New York.
OTIS B. SCHREUDER, Dayton, Ohio.
CHRISTIAN F. SCHRIER, Detroit, Michigan.
LOUIS SCHWARTZ, Washington, D.C.
JAMES E. SEGRAVES, Chicago, Illinois.
JAMES A. SELIGMAN, Wilmington, Delaware.
CHARLES FRANCIS SHOOK, Toledo, Ohio.
JOHN F. SHRONTS, Minneapolis, Minnesota.
THADDEUS DEWEY SMITH, Neenah, Wisconsin.
THEODORE J. SMITH, Whiting, Indiana.
KENNETH F. STOTZ, Chicago, Illinois.
LLOYD FINLEY TETER, Battle Creek, Michigan.
JOSEPH H. THOMAS, Chicago, Illinois.
WILLIAM ANTHONY TOMASCO, Philadelphia.
PHILIP TULIN, Bristol, Pennsylvania.
FRANK E. URBANEK, Chicago, Illinois.

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DALE M. VACHOUT, Chicago, Illinois.
ARKELL MEYERS VAUGHN, Chicago, Illinois.
JOHN VINCENT WALKER, Chicago, Illinois.
EUGENE L. WALSH, Chicago, Illinois.
ROBERT MORGAN WATROUS, North Chicago, Illinois.
WALTER WEINBERGER, Altoona, Pennsylvania.
ERNEST WOLFF, Euclid, Ohio.
MARION DWIGHT WYGANT, Mishawaka, Indiana.
AARON YAFFE, Milwaukee, Wisconsin.

BOOKS

Food and Temperature

NUTRITION AND CLIMATIC STRESS: H. H. MITCHELL and MARJORIE EDMAN. Charles C. Thomas, Publisher, Springfield, Illinois, 1951, pp. 234, $6.75.

THAT low-humored and ancient story about the behavior of a chameleon placed on a Scotch plaid loses all significance when compared with the plight of quartermaster divisions of military establishments trying to meet the dietary and clothing requirements of personnel temporarily located at the tips of North, South, East, and West, to say nothing of the in-between—the tropics. Not only is there the matter of basic selection and procurement, but also getting it all there and on time without any of those horrible mixtures of sending a shipload of Arctic parkas and the equivalent of walrus meat and pemmican to a lot of equator straddlers, or the dreadful reverse—mere breechclouts for Eskimos. The quartermasters needed help and got it—in part through appropriate departments of the University of Illinois. Hence this book long after military applications .... but there seems to be no end to military shufflings of personnel. So the usage is continuing. Besides, in this world, no longer a mere melting pot but a pressure cooker, non-military abiders in highly dissimilar climes need dietary and clothing adjustments. All this becomes the basis of this book. Of the situation, let the authors speak a little of their own thinking:

"Man inhabits all climatic regions of the Earth, as diverse as those of the polar regions and the tropics. With the development of the airplane, he has extended to a considerable degree the third dimension of the habitable Earth with its own peculiar climatic features. These facts testify to the great adaptive powers of the human organism. These adaptive powers can be broken down into physiological and constitutional factors on the one hand, and cultural factors on the other. By reason of purely physiological processes the human body can maintain its temperature within narrow limits under variable environmental conditions simply by modifying its rate of heat production, or by modifying the rate at which heat is dissipated from the surface of the body and from the respiratory tract. Constitutional differences between races of men, such as differences in body size and conformation, differences in pigmentation and other properties of the skin, and differences in the efficiency of temperature regulatory mechanisms may also operate in climatic adaptations. By cultural methods man can modify his own immediate environment and thus minimize the stress of the climate in which he resides. The type and quality of clothing and of housing, and the use of artificial heating, and later cooling, devices enable him to supplement physiological processes and constitutional characteristics in maintaining his normal body temperature in the face of extreme climatic stress. The diet of men living in different climatic regions varies greatly, both in quantity and in the nature of the foods of which it is composed. These differences are dependent upon the availability of foods of different descriptions, obviously. There is a possibility that men to a certain extent select their foods and acquire food habits best adapted to aid them in combating climatic stress."

This is no book for the rabid isolationist who believes that "hog and hominy" meet all gourmet requirements the world over. Such "vittles" are good—but scarcely for some unenchanted island with a temperature of 110° F in the coconut shade and humidity to be measured only by the bucket.

Notable Issue

THE MEDICAL BULLETIN (Twentieth Anniversary Issue): Standard Oil Company (New Jersey) and Affiliated Companies. Volume 12, Number 1, 1952, pp. 206.

IT IS NOT customary for this Journal to review an issue of any medical periodical. However, this Twentieth Anniversary Issue of the Standard Oil Company of New Jersey and its Affiliated Companies' *Medical Bulletin*, is so notable as to warrant departure from custom. The issue is centered about education in industry, with its program crystalized in a fore-piece quotation from Lord Horder: "Inevitably, the doctor's work in the future will be more and more educational, and less and less curative. More and more will he deal with the physiology and psychology of his patient, less and less with his pathology. He will spend his time keeping the fit fit, rather than trying to make the unfit fit."

"Scientific progress is breath-taking in scope and speed. Medical Science is apace of others. Medicine in Industry shall not be embarrassed in this race." So begins this publication. These words must be true, for this bulletin itself is breath-taking. Two hundred and six pages are devoted to 40 papers embracing every requirement of good industrial medicine in the United States and throughout the far-flung activities of New Jersey Standard Oil Company the world over. This Conference was limited to selected medical representatives from 15 countries in both hemispheres, together with invited guests, all of whom were participants. So constructive is the group thinking that the regret is that every industrial physician may not have a copy. Nothing is said about sales price, but a guess is that inquiry directed to DR. ROBERT C. PAGE, General Medical Director, Standard Oil Company (New Jersey), 30 Rockefeller Plaza, New York 20, might lead to the acquisition of a copy, and possibly without charge.

The Aging

DISEASES IN OLD AGE: A Clinical and Pathological Study of 7941 Individuals over 61 Years of Age, by ROBERT T. MONROE, M.D. Harvard University Press, Cambridge, 1951, pp. 407.

FOR A SCORE of years or thereabouts, numerous publications, including books, have been directed to the generalities of geriatrics and gerontology.

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Much effort has been expended to convince the readers that there are increasing thousands of aged and aging persons, and that they are a lot unto themselves, with all manner of difficulties in adjustment, adaptation, security, and such. Few of these publications ever got down to cases. Now comes along this new book almost exclusively devoted to the exact diseases of a specific aging population. This book begins:

"There were 7941 individuals over the age of 61 years—i.e., who had passed their sixty-first birthday—who entered the medical service of the Peter Bent Brigham Hospital from its opening in March, 1913, to March, 1943. Of these, 4088 were men and 3853 were women."

This book is a record of the pathological states presented by this population. Only in the last chapter does the author invade the domain of generalities, which he does under the heading "Community Resources Essential for Old People."

Many of the findings were significant and some few are startling. Twenty-four and eight-tenths percent of those subjected to autopsy disclosed malignant disease, but, by no means, does this reflect a frequency applicable to the total population. It is noteworthy in this day and time of apprehension over loss of hearing that 74% of men and women in the 61-65 age group were without significant hearing impairment. Forty-one per cent proved to be without a disturbing degree of mental and nervous system impairment. As might have been expected, the commonest disease of old age (arthritis possibly excepted) relates to the heart.

The question arises whether the older citizens chiefly of Boston and Massachusetts are representative of the nation as a whole. While there may be disposition to label that area as a world set apart and peculiar unto itself, there are no sound reasons to believe that Texas or Idaho would provide striking deviation from the disease patterns leading to the structure of this stimulating book.

Navy Industrial Health

PROCEEDINGS OF THE THIRD ANNUAL NAVY INDUSTRIAL HEALTH CONFERENCE. Published in 1952, pp. 90, "Limited free distribution on request."

AT THE time of the Industrial Health Conference in Atlantic City in April, 1951, the Navy staged its own conference on Industrial Health. This is the record. Some 120 members of Navy personnel attended and participated. The program was highly varied, its subjects ranging from forms to uniforms. The prime purpose of this notice is to announce a forthcoming Fourth Annual Navy Industrial Health Conference in Cincinnati, again along with the Conference on Industrial Health, April 19-26, 1952.

MEDICALLY IRRELEVANT

I DON'T know how newspapers got into the world, and I don't think God does, for He never mentions them in the Bible. Maybe the editor was one of the Fallen Angels, for he seems to fall for about everything that people tell him. If the editor makes a mistake, folks say he ought to be hung; if a lawyer makes a mistake he appeals the case; when a doctor makes a mistake they say nothing 'cause they don't know Latin and they couldn't read his writing if they did. An editor makes a mistake, there's a lot of hollering, cussing, and a libel suit, while when the doctor makes a mistake there's a funeral, with flowers and silence, perfect silence. A doctor can use a word a mile long and it won't make any difference if he knows what it means, for folks will think he's educated, while an editor has to be able to spell any word he uses. If a doctor goes to see another man's wife he charges for the visit, while if the editor goes, he gets shot. People who call the doctor and get well think he's a great man. If they don't get well, they're dead and can't say anything. Two-thirds of the folks in town are sore at the editor either because the paper said something about them they didn't like, or said something nice about somebody else.

—Editorial in *Easley (North Carolina) Rotary News*, quoted in *Chicago Daily News*, April 12, 1952.

ON A recent visit to a small industry, an Ontario sanitarian noticed a common drinking glass set atop the water cooler. To impress the danger of this utensil, he suggested that even though the people in the plant might all be free of communicable diseases, some visitor who might come in and use the glass could leave disease bacteria on the rim to be transmitted to them. On his next visit, he found that his lesson had indeed made an impression—the same glass rested in the same place atop the water cooler, but on the wall beside it was a brand-new paper cup dispenser with a hand-lettered sign advising: "VISITORS MUST USE PAPER CUPS."

—*Health Officers News Digest*, March, 1952.

AMONG the anniversaries which should not go unmarked is that of the match, which was invented by an Englishman and first sold on April 7, 1827. Since that time, the common or kitchen variety of match has undergone quite an evolution. The original matches were called Sulphurata Hyperoxygeneta Friction, or "lucifers," because they smelled so bad. After 125 years they are simply called matches and still don't smell very good. However, there have been improvements. First a Swede devised the safety match which had some of the chemical ingredients which make it burn applied to the box cover. An American carried this a step further and thought up paper matches which use the same principle. But before any of these types of matches were used, people started fires by striking flint against steel. Now we have completed a full cycle; the modern cigaret lighter is nothing more than a fancied up tinder box with built-in flint and steel. It would be difficult to assess the safety, the convenience and the economic contribution that the match has made to modern civilization. It becomes a little more evident when we realize that 57 million of them are used every hour of every day. But we also can't help looking at the other side of the picture. How many pairs of trousers were worn out by striking matches on the seats before the safety type came into use? How many tons of shoe leather were destroyed the same way? And we can't overlook the affinity of the American cowboy and the kitchen match. No one ever achieved the nonchalance of Bill Hart who, faced by a saloon full of desperadoes, calmly lit his cigaret by flicking his thumb nail across the head of the match. When that art died out, the he-man of the Wild West passed into oblivion.

—*Detroit Free Press*, April 9, 1952.

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Lay First Aid in Small Industrial Plants

ELSEWHERE in these pages we publish the Detroit Plan Manual for lay first aid in small industrial plants. This Manual, as prepared, is sponsored by a qualified group of Detroit industrial physicians. While it bears resemblance to other first aid manuals, and notably to those of the American Red Cross to which organization indebtedness is recognized, this Manual properly fails to emphasize such little industry-associated items as snake bites, freezing, bee stings, and their like. It is keyed to industry—and industry without readily available medical services.

The untrained lay first aid administrator in industry is ever a potential threat to the best interests of the sickness and accident victims anywhere. This statement does not apply to that small number of well trained but still non-professional first aid assistants in industry whose capacities in routine matters calling for no exercise of astute medical judgment, are superb and who sometimes exceed in dexterity either physicians or nurses. Labelling ordinary lay first aid only as a necessary evil, it must be condoned as one side-product of the enigma of how fully to supply professional medical care in the multitudinous small plants of the land. Inevitably there come about, both in and out of industry, those sicknesses, injuries, or accident situations when, perforce, lay first aid must be applied to save life. Then let that form of care be good. Such is the purpose of this Detroit Plan Manual.

The trainee in lay first aid, at the outset of his training, should espouse three fundamentals:

1. The care of a victim, as furnished by the lay first aid worker, never is the equal of that at the hands of the physician or nurse.

2. Doing the wrong thing may be far more disastrous than doing nothing beyond protecting the victim from further exposure and from well meaning by-standers.

3. Some 90% of victims in industry require no immediate emergency care and can await the arrival, or specific directions, of the physician.

This Manual contains some instructional items about which the hope is entertained that no unskilled persons ever will be obliged to perform them. Still, the possibility is that just those unfortunate circumstances will arise, when the layman will find himself without choice. No prospects of a physician; no nurse anywhere; no time to be lost. Then, go ahead—but let it be good. There will be unfavorable criticism of this Manual. That is commendable so long as the criticism is registered for consideration. The deadly criticism is that which is governed by silence, or is voiced to little groups equally unvocal. This may not be the only edition of the Detroit Plan Manual. Its own deficiencies may be disposed of in future printings. But, shortcomings must be brought to light.

Physicians and Surnames

IN MAN'S struggle toward the recognition of his individuality, there came the time when he wanted a name. No longer was he content to be Joseph, "The Bald," or Harry, "The Fat." At that comparatively recent time, a man's work often was utilized in the creation of his name.

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It is perhaps true that the leather and textile trades furnished more surnames than any other occupation, since those trades were outstanding during the name-taking era. It becomes easy to see about us the results of that practice in such names as: "Turner, Roper, Tanner, Smith, Joiner, Bard, Skinner, Fisher, Bookman, Mason."

Place names, in the aggregate, were almost as common. Thus, "John who lived at the top of the hill" became "John Hill." The family on the meadow became "Meadows," or more likely, "Praeters" or "Pratt" since both the latter spring from "Praetum," the Latin for meadow. In good course, all persons acquired a surname.

One of the favorite surname sources was color, and possibly the color of the hair, skin, or other portion of the body was the determinant. One of the longest name lists in the telephone book is that of "Brown," with some fewer "Black, White, Grey and Green's." Only a sprinkling of "Blue" and "Purple" appear, while "Yellow" has not been found. Apparently, on name-taking day, chronic jaundice constituted no lure for Edward, "The Icteric."

It is passing strange that the medical profession contributed few surnames. The unnamed man was prejudiced against his diseases, body organs, medical acts and instruments. A few adopted the name of "Leech" or "Leach," such being an early name for physicians. Rarely there may be encountered families by the name of "Cure," "Heal," "Treat," "Pain," "Ache." The name "Dement" is relatively common, but the suspicion is that this represents a corruption of some European name unrelated to "dementia." Almost without exception, one searches in vain for such names as "Malady," "Bile," "Bubo," "Coma," "Navel," "Carotid," etc. In them is no attraction. There are a few "Eyes," "Tongues," "Throats," "Arms," and "Legs," but "Foot" and "Kidney" fared better.

Common foreign surnames unfailingly may be related to medical pursuits and body parts, but this is little discernible to those who are not linguists. The common Mohammedan name "Hakim," well known in the United States among immigrant descendants, variously means "physician," "judge" or "teacher." The family name of the famous Russian musician Moussorgsky scarcely would be recognized as "he of the bad breath." Historically in Tamerlane is another example. Originally he was but Tamer, "the limper," after his javelin-inflicted orthopedic injury. This name, in opprobrium, was created by his opponents. All in good time he became "Tamerlane"—but still, Tamer, "The Lame."

Telephone books are apt to reveal a few "Doctor" as surnames, but conjecture prompts the belief that such sometimes represent recent acquisitions after abandoning unwanted or offensive names, as directly translated into English. The surname of "Doctor" manifestly would prove an asset to anyone aspiring to high standing. No possibility of the spurious attends the name of the well known Philip Syng Physick, the early Phildelphia surgeon.

When one casts about for reasons why medicine contributed so few last names, readily it may be observed that the physicians, being of higher caste, already had distinguishing names. Thus, it was unnecessary for the venesection specialist to become "Dr. Bloodletter."

Many names that might appear to be of medical origin, such as "Lance" or "Clive," were adopted for non-medical reasons. "Lance" springs not from "Lancet" but from military arms. "Clivus" leading to "Clive" indeed related to a bony area at the base of the skull, but more importantly, "Clivus" in Latin means "the side of the hill." There were many residents on the side of the hill, and they became "Clive." The surname "Cutter" probably springs from ships and not from surgeons.

Further in narrowing the surnames from medical sources is the obvious that always man has eschewed any favor for his diseases. Scarfaced Joe did not find pleasure in becoming Joseph "Acne."

Still further, most of the terminology of medicine throughout the ages closely has been identified with Latin or Greek. During the surname-taking period, these old languages were little favored, although through modification many surnames have ultimate Latin or Greek origin.

Medicine has its own lengthy vocabularies, terms by the thousands and tens of thousands, but relatively few of this country's surnames spring from that profession.

NEWS, COMMENT, OPINION

The shepherd drives the wolf from the sheep's throat, for which the sheep thanks the shepherd as his liberator, while the wolf denounces him for the same act as the destroyer of liberty, especially as the sheep was a black one. Plainly, the sheep and the wolf are not agreed upon a definition of the word "liberty"; and precisely the same difference prevails today among us human creatures, all professing to love liberty. —Abraham Lincoln

Executives

THE "Life Extension Examiners" quote the following statistics: of 10,000 business men with an average age of 45.6 years, only 22% were considered in perfect health; *Advertising Age* found that executives who died in 1950 averaged 57¼ years, which is 10 years below the expected life span. At the Michael Reese Hospital in Chicago, in an examination of 55 executives under age 50, it was found that only 5.4% were free of organic disorders. Obesity, hypertension, heart ailments and fatigue were among the leading pathological findings.

—*Clinical Med.*, February, 1952.

Public Health

PUBLIC-HEALTH protection means: sanitation, communicable-disease control, recording of vital statistics, laboratory services, protection of maternal and child health, detection of chronic disease, and health education. These are the seven basic responsibilities of local health units, of which the Council of the Massachusetts Medical Society, through its committees on national legislation and medical economics, says: "It is acknowledged universally that the seven basic responsibilities attributed to local health units by Dr. [Haven] Emerson are to a great extent a governmental responsibility."

—From an Editorial in *New England J. Med.*, February 28, 1952.

Sedamyl

HARRY E. TEBROCK, M.D., Medical Director, Sylvania Electric Products, Inc., in *Medical Times* (December, 1951), reports a recent study of Sedamyl—daytime sedative developed by Schenley Laboratories—in connection with nervousness and anxiety as causes of absenteeism. Sources of nervousness ranged from overfatigue and nervous excitement arising from working conditions and personal adjustments to such physical causes as pre-menstrual pain and gastric and cardiac disturbances. A total of 426 patients were treated over seven months. Favorable responses were reported in 385 cases, or 90.4%. In 92.2% of the favorable responses there were no side effects such as drowsiness, vertigo, or nausea.

Work and Live Longer

QUESTION: Can Industry Reduce the Death Rate? Answer: Yes, as indicated by the amazing three-year record of 21,000 employees of an insurance company that has health and safety programs, There have been only 382 deaths; only one-fourth as many deaths among men from T.B. and not a single death among women; only 27% as many deaths from pneumonia and flu; 40% as many deaths from diabetes; 37% as many deaths from accidents as the general average. What a record for other companies to shoot at!

—From "Let's Explore Your Mind," by ALBERT EDWARD WIGGAM, in *Chicago Daily News*, March 6, 1952.

Industrial Medicine Helped

LONGEVITY among American wage earners and their families increased to a new high in 1951, with expectation of life at birth rising to 68.5 years, according to Louis I. Dublin, Ph.D., chief statistician of the Metropolitan Life Insurance Company. This is a gain of about one-fifth of a year over the 1950 figure. Since the latter part of the 19th century, expectation of life at birth has doubled in the industrial population. Among Metropolitan's industrial policyholders, average length of life has increased by five years in the past decade, and by 10 years since the early 1930's. The gains are attributed by Dr. Dublin to more healthful living and working conditions, better food, and to the outstanding gains in medical science and public health administration.

—*J.A.M.A.*, March 8, 1952.

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Staff Appointments: (D-109) Large Brass Co.; five days; eight hours; opportunity for research; $800; Detroit area. (D-110): Large plant; Niagara Falls area; substantial salary; excellent working conditions. (D-111): Take over medical installation; requires experience in explosives and chemicals; some emergency surgery; five days; near Chicago. (D-112): Work in dispensary of large Ohio Co.; mostly traumatic work; some minor surgery; major surgery experience very advantageous; city 350,000; excellent salary; advancement. (D-113): Western mining Co.; $600 plus own fees for private practice and OB's; minor surgery. (D-114): Regional plant of large company; about $12,000; act as Medical Director; new plant; town 80,000; South West. (D-115): Full or part time; St. Louis. (D-116): two required; large plant; $8,000; Chicago. (D-117): Large southern chemical Co.; $9,600. (D-118): Wisconsin ordinance works; EKG's and X-rays; good salary; summer resort area. (D-119): Railroad medical examiner; licensed, Pennsylvania; some travel in own car; mileage and good salary.

Other opportunities in South Carolina, Florida, New Mexico, Kansas and Oklahoma.

IF NONE OF THESE MEET YOUR REQUIREMENTS LET US PREPARE AN INDIVIDUAL SURVEY FOR YOU. PLEASE SEND FOR OUR ANALYSIS FORM.

Ann Woodward, *Director*

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Cost Plus . . . .

THE *Las Vegas (Nevada) Sun* charged in an editorial Wednesday that a doctor here earned $3,450 for 25 hours' work. He examined workmen at the Atomic Energy Commission's A-bomb proving ground near here. Publisher Hank Greenspun said in a front-page editorial that the doctor examined 150 workers hired for a construction project at the test site and presented a bill for $6,000 to the Haddock Engineers & Associates Ltd., prime contractor for the project. The contractor was working on a cost-plus basis. Greenspun said the doctor charged $40 per examination of which $17 went for laboratory fees and $23 "represented 10 minutes' work per man for being checked." The editorial said the same examination done for insurance companies and other private concerns usually costs $25, including the laboratory fee. Greenspun said the examinations were made late last week. The Haddock firm was accused by a rival contractor of having paid huge wages to workmen at the project during AEC hearings here and in Los Angeles last month. The rival firm was the McNeil Contracting Co. of Los Angeles.

—*Chicago Daily News*, March 12, 1952.

The Individual Has a Duty . . . .

THE idea that ill health and illness are only hard luck and that the individual in a good society should not have to pay their penalty, was manifested to the fullest extent in the Socialist Government's 1948 health law. Anybody could get, free of charge, whatever medical, surgical, dental and hospital care he needed simply by paying a weekly contribution to a national fund. This, however, has proved impractical. The Toronto, Canada, *Globe and Mail* points out: "This is a fine plan on paper but even the Socialists were compelled to admit that it didn't work in practice. Human nature, it was found, does not stand up to the enticements of a health service that is 100% gratis, not even British human nature which is notable for common sense and moderation. When medical advice is to be had for the asking and everything from headache pills to toupees is buckshee, people feel ill oftener than they should and fill up their medicine cabinets with all sorts of superfluous bottles and appliances." Not only did the British health service cost over one-third more than the original estimate for a year, but, according to the paper, "there was a decline or at least the danger of a decline, in the standards of professional health service because people with nothing wrong with them were crowding into doctors' offices, wasting their time and obliging them to scamp the attention they could give each patient." The changes in the plan are only a modifying policy. There is to be a maxi-

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mum charge for dental services of one pound, with the state paying the remainder if it is larger, and the patient paying the entire amount if it is smaller. There will be slightly higher charges for private hospital beds, surgical aids and medicines. The editorial concludes that the British government: "....is saying in effect that illness is not entirely hard luck. The individual has a duty to look after his teeth and his general health. If he fails, he ought to pay at least a small fraction of the expense of putting him right in addition to the regular contribution which only partly covers the cost of insuring him....There is an advance here toward realism as well as toward justice and economy."

—*Minnesota Med.*, March, 1952.

Drop That Eclair!

WHEN stocks and bonds go down, the sugar content in the blood and urine of many a business man goes up. Among doctors—who are not alarmed—the fact is a familiar one, proved by reaction studies made at the stock market. Oddly, medics are pleased, for while diabetic business men, chiefly executives, number more every year, MD's see this increase as a sign of improved general health; they also point to today's longer, more useful life for diabetics. Most often hitting middle-aged upper income earners (75% show first symptoms over 50), diabetes is a disease to which the business executive is particularly susceptible. Mental excitement, worry, intellectual strain—all unavoidable in managerial work—up the blood's sugar content. Given a tendency to diabetes, the executive's chances of developing the disease are good. General Motors, one of 300 corporations which keeps tabs on executive health, reports obesity outranks other diagnoses two to one. Fat men are ripe for diabetes, and among them abnormalities and pre-diabetic conditions are widespread. Ten times more subject to diabetes than his lean colleague, the worried, over-weight executive should eat less, exercise more. When fat men overeat, strain is placed on the insulin-producing pancreatic gland. If the gland has been injured or is inherently weak, it fails and diabetes results. Once detected, diabetes is treated with diet, exercise, and insulin. But, while the doctors praise the insulin miracle, they point out at the same time, that prevention is much cheaper than control in any income bracket. The medical moral to big men in the big money: Get out on the golf course and drop that chocolate eclair!

—*Forbes*, September 15, 1951, quoted in *Management Review*, February, 1952.

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Not Hard Luck

BY DEFINITION, an accident is a happening determined by chance. On this basis the frequency of accidents is determined by the risk inherent in any situation and should follow the pattern for chance happenings. However, when large groups are analyzed it is found that there is

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a small high-accident group with certain characteristics which make them known as "accident prone." Briefly, these "accident prone" people have an unusually large number of accidents, year after year. We have heard much about these "accident prone" people recently and one might gain the impression that this type of an individual is a recent discovery. In 1929, the Cleveland (Ohio) Electric Railway Co. published the report of a well planned study under the title "The Accident Prone Employee." They found that accidents do not distribute themselves by chance, but that they happen frequently to some men and infrequently to others as a logical result of a combination of circumstances. Those individuals who because of certain mental, psychological or physical defects, fail to control a situation leading to an accident, usually become involved; while those possessing the necessary physical and mental requirements show little susceptibility to accident. This study refuted the age-old theory that accidents are a matter of hard luck and that they cannot be prevented.

—From "The Human Element in Accidents," by EARL R. RICE, M.D., in *Mississippi Valley Med. J.*, March, 1952.

Health Tests

VOLUNTARY multiple health tests have been performed on more than 1,000,000 persons in Georgia during the past six years. Almost all these persons have been tested by chest roentgenograms and by syphilis serology. Over 300,000 persons in the past year and a half have been given blood tests for anemia and for abnormalities of carbohydrate metabolism. Smaller numbers have had oral and dental inspections by dentists and height and weight determinations. All evidence points to the fact that at least in Georgia, with the specific tests enumerated here, multiphasic health test surveys of more than half the entire adult population of the entire state can be done in a manner mutually profitable and acceptable to all. Both patient and physician profit from early case finding when the patient is still capable of self-support and is not a burden to his family or the state. The possibility of successful surveys may still be debated, but in Georgia they are an accomplished fact.

—From "Voluntary Multiple Health Tests," by LESTER M. PETRIE, M.D., C. D. BOWDOIN, M.D., and C. J. MCLOUGHLIN, M.D., in *J.A.M.A.*, March 22, 1952.

In Arkansas

THE Committee on Industrial Health reports: (1) A survey of existing manufacturing companies was made and health hazards catalogued. (2) Investigations of health hazards due to overcrowding in three sections of the state were investigated at the request of the A.M.A. Council on Industrial Health. In some areas the water supply was short and sewerage disposal system inadequate for the sustained load due to increase in population. Cities in these areas were con-

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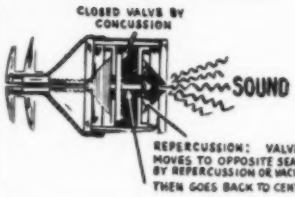
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scious of these shortcomings and were making plans to correct the deficiencies. Housing was tight but not deleterious to the health. Ample doctors were available to give adequate medical care. Hazards in mining camps and other manufacturing concerns had already been corrected. Most of the manufacturers are small, and health problems are pretty well worked out by management and labor mutually.

—*J. Arkansas Med. Soc.*, March, 1952.

New Society

VENEZUELIAN SOCIETY OF OCCUPATIONAL HEALTH: One indication of the expanding world of industrial health is found in the announcement that in Venezuela the industrial physicians of that country, with headquarters in Caracas, have organized "Sociedad Venezolana de Medicina del Trabajo y del Deporte, Colegio de Medicos del Distrito Federal, Plaza Bellas Artes, Urbanizacion 'Los Chaguaramos,' Caracas, Venezuela." The officers are: Presidente, DR. FRANCISCO J. LEON A.; Vice-Presidente, DR. JESUS A. YERENA; Secretary, DR. PABLO IZAGUIRRE; Treasurer, DR. MARCO TULIO EUGENIO; Vocales, DR. ALEJANDRO PRINCIPE; DR. CESAR ACOSTA; DR. LUIS A. ALVARADO. It is the hope of this Journal that from time to time reports may be published descriptive of the enterprises of this Society. Always the need is for more and more information relative to the peculiar occupational diseases of other countries.

What Is Prevention?

PREVENTION includes measures which avert the *occurrence* of disease and those which halt or retard the *progression* of disease into disability or death. These two major goals of prevention are classed as primary and secondary prevention. PRIMARY PREVENTION means keeping a disease from occurring. Many more chronic diseases and impairments are amenable to primary prevention than one might suppose. For example, use of penicillin in the treatment of expectant mothers who have syphilis results in *primary prevention* of congenital syphilis. The disease does not occur in the infants whose mothers receive adequate treatment during pregnancy. Similarly, the wearing of protective goggles in certain jobs is a method of *primary prevention* of blindness that may result from industrial injury. Proper diet can prevent the occurrence of pellagra, a chronic nutritional deficiency. SECONDARY PREVENTION means halting the progression of a disease from its early, unrecognized stage to a more severe one. Many encouraging examples of secondary prevention illustrate 20th Century advances in medical science. One instance cited was Alfreda T., a patient who came to a clinic early in 1922 with diabetes mellitus of three years' duration. Within two days, despite all medical efforts, she developed progressively severe diabetic coma and died. Before the year (1922) was over, the discovery of insulin as a means of controlling diabetes was

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announced. Since that dramatic discovery, "countless Alfreda T.'s have been spared by diligent case finding and conscientious care."

—From "Prevention of Chronic Disease," Summary of 1951 Conference on Chronic Diseases.

ACC Anechoic Laboratory

AS CHEMICAL experiments must be performed using absolutely clean test-tubes to obtain accurate and reproducible results, acoustic measurements must be conducted in a "clean" environment. To the acoustician the term "clean" means the absence of spurious sounds during acoustic measurements. These spurious sounds are generated by reflection of the original test sounds from the walls of the measurement laboratory and by interference of sounds external to the laboratory. Outdoor measurements have become a standard method of overcoming sound reflection and consist of mounting a sound source, usually a loudspeaker angled upward, near the ground. A microphone is located on the axis of the sound source, usually on a boom extending from a tower. Since there is no appreciable reflecting surface, energy which does not strike the microphone is dissipated in the atmosphere. The method suffers from the disadvantage that its use is restricted to periods when excellent meteorological conditions prevail. Ambient noise also interferes with measurements, and the sound's being generated during measurements is disturbing to those working in nearby buildings. Outdoor reflection conditions can be duplicated indoors in anechoic (echoless) rooms, by treating the laboratory surfaces with discontinuous sound absorbent materials. This type of treatment is generally expensive and space-consuming, but it offers the advantage of a scheduled working program. The laboratory is always located in a quiet section of the building to reduce the entrance of exterior sounds. Two types of anechoic laboratories are at present in use —the wedge-type as employed at the Bell Telephone Laboratories, and the baffle-type as employed in the RCA Laboratories. The former consists of a room in which all surfaces are treated with an extremely large number of glass fiber wedges which absorb sound on their surfaces. Supporting the wedges requires a complicated and expensive structure. The baffle-type laboratory consists of straight baffles of hair felt of predetermined length. The frequency of sound absorbed is a function of the length of the baffle, so that the room can be "tailor-made" to reduce reflection in the useful frequency spectrum only. In addition to the savings effected by using only as much material as is absolutely necessary, the supporting structure is simple and inexpensive. The total cost of sound-absorbent and construction materials used in this room was not in excess of $1,000. The anechoic laboratory constructed in Protective Division of the Chemical and Radiological Laboratories of Army Chemical Center, Maryland, is of the baffle type; the baffles are angled from the surfaces of the room in order to provide a greater length of absorbent in a small space. This laboratory will be used in determining the acoustic properties of the gas mask facepiece. Aided by this data, better speech trans-

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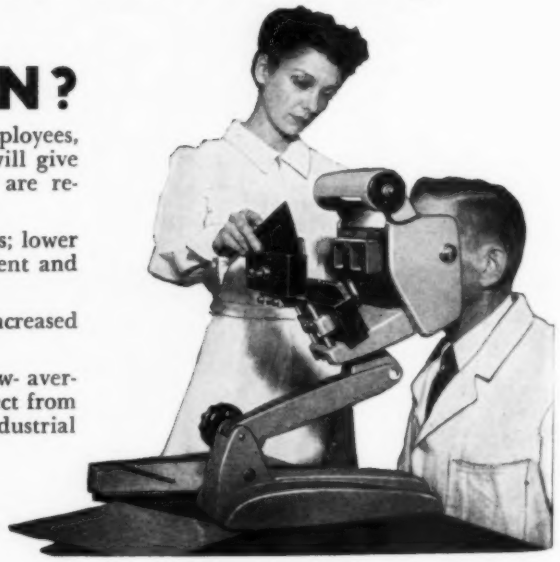

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mission while wearing the gas mask can be provided.

Estimates

IT IS ESTIMATED that Americans spend between 10 and 11 billion dollars annually for health services. One out of three people is totally disabled every year, and for one out of seven that disability endures five weeks or more. In the span of 12 months, one out of 12 is hospitalized for an average stay of 10 days. Americans lose more than one billion days of work each year on account of sickness. In the course of an average lifetime, an individual will be disabled 17 times. Only one dwelling in 400 will be damaged by fire. Only one automobile policy in 33 will result in a loss each year, but one disability insurance policyholder in every four will file a claim.

—*Best's Insurance News*, February, 1952.

Not So Habit-Forming . . . .

MANY persons with insomnia need help from drugs. They could get to sleep without them, but they might have to wait until 2:00 A.M., and that would mean that they would be sleepy next day. . . . Many laymen and even some physicians fear soporifics and think that they are habit forming, but in my experience, they are not. True habituation with euphoria or a running up of the dosage, or withdrawal symptoms have been reported, but I have not seen the syndrome. In 45 years I have seen perhaps a dozen persons who were taking barbiturates to excess, but they had all had a psychopathic personality to begin with. Every one of them was able to stop the use of the drug instantly and without symptoms of withdrawal; their only complaint then was that without help from *something* they could not sleep.

—WALTER ALVAREZ, M.D., in "The Neuroses," quoted in *North Carolina Med. J.*, March, 1952.

Hurry to Be Late

THE DSR has received the unkindest cut of all. Service is so bad that people won't even accept free rides. Those entitled to them are the system's own employees. But instead of coming to work on buses or trolleys merely by flashing a pass they drive their own cars, or even use taxicabs. Around terminals the parking problem has become acute. DSR workers interviewed on why they pay their own way explained that they must get to their jobs on time. If they ride at their employer's expense they are late. There is a nightmarish element of fantasy in this. We have the spectacle of DSR men rushing along that they may be on time for employment which enmeshes them in lethargy. They hurry conscientiously to operate a system which makes those who use it tardy.

—*Detroit Free Press*, February 9, 1952.

Fraud to be Punished

OUT OF some 11,500 physicians serving California Physicians' Service, investigation revealed that about 200 probably were abusing the plan. Perhaps, "over-using" might be a better term. Out of that whole group there were two or three instances of what appeared to be—and I do not possess the full evidence—actual fraud. In one instance it is reported that a physician billed the Service for an operation which he did not perform. In another instance, a physician

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is said to have performed a simple operation and billed the Service for an operation of greater magnitude which carried a much higher fee. I am informed that in one case fraud has been established. The others are in the process of investigation but the initial evidence indicates that they will fall into the same classification. The County Medical Association has already proceeded in the first instance. The offender, if found guilty, will be disciplined to the full extent possible which is loss of his membership. Already the State Board of Medical Examiners has been apprised of this physician's supposed misconduct and, if the evidence justifies action, his license probably will be revoked on grounds of moral turpitude. After that the District Attorney of the County and perhaps the Federal District Attorney will be supplied with the evidence, and criminal prosecution may be instituted. That decision lies without the scope of the medical profession but the medical profession cannot and will not tolerate that variety of conduct on the part of any physician. The publicity has had a serious initial effect upon the medical profession and upon the Blue Cross and Blue Shield Plans all over the country. In the end, I believe the net result will be good. The medical profession is determined that our pre-payment plans are properly protected from unscrupulous physicians, and those who infringe the code of ethics will be disciplined.

—From an Address by JOHN W. CLINE, M.D., President, A.M.A., San Francisco, April 2, 1952.